

**2004-2005 US LOA CHINOOK PROPOSAL**

Submitted as a Final Report as fulfillment of the LOA Funding secured in 2004.

TO:

U.S. CHINOOK TECHNICAL COMMITTEE,  
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**PROJECT TITLE**

**Documenting the existing Individual Stock Based Management (ISBM)  
provision of the Chinook chapter of the Pacific Salmon Treaty: Data,  
methods, user guide and limitations.**

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## EXECUTIVE SUMMARY

In 2003, some members of the Chinook Technical Committee raised questions regarding the implementation of the Individual Stock Based Management (ISBM) provision of the Chinook chapter of Annex IV of the U.S.-Canada Pacific Salmon Treaty. Consequently, a review of the implementation and application of the ISBM provision was identified as a high priority item with regard to the Chinook Letter of Agreement (LOA) funding. This is the first of two reports that are promised under that funding.

This report has two primary objectives. They are:

1. To document the source of data that is used to compute the ISBM indices for each of the stocks identified in the Chinook chapter.
2. To document the algorithms used in computing the indices pre- and post-season for each of these stocks, and the procedures used in the extracting the data from the Chinook Technical Committee's Chinook model or from coded wire tag (CWT) data.

A third primary objective was to identify problems with these indices. Initially the identification of problems with the indices was to be part of a second phase report along with proposed recommendations or alternatives designed to address these problems. However, while documenting these indices, several limitations for the use of ISBM indices pre and post-season were identified which are also summarized in this report. Possible alternatives to the use of ISBM indices pre and post-season, with a feasibility analysis of these alternatives, will be investigated in a report next year (2006-2007 cycle).

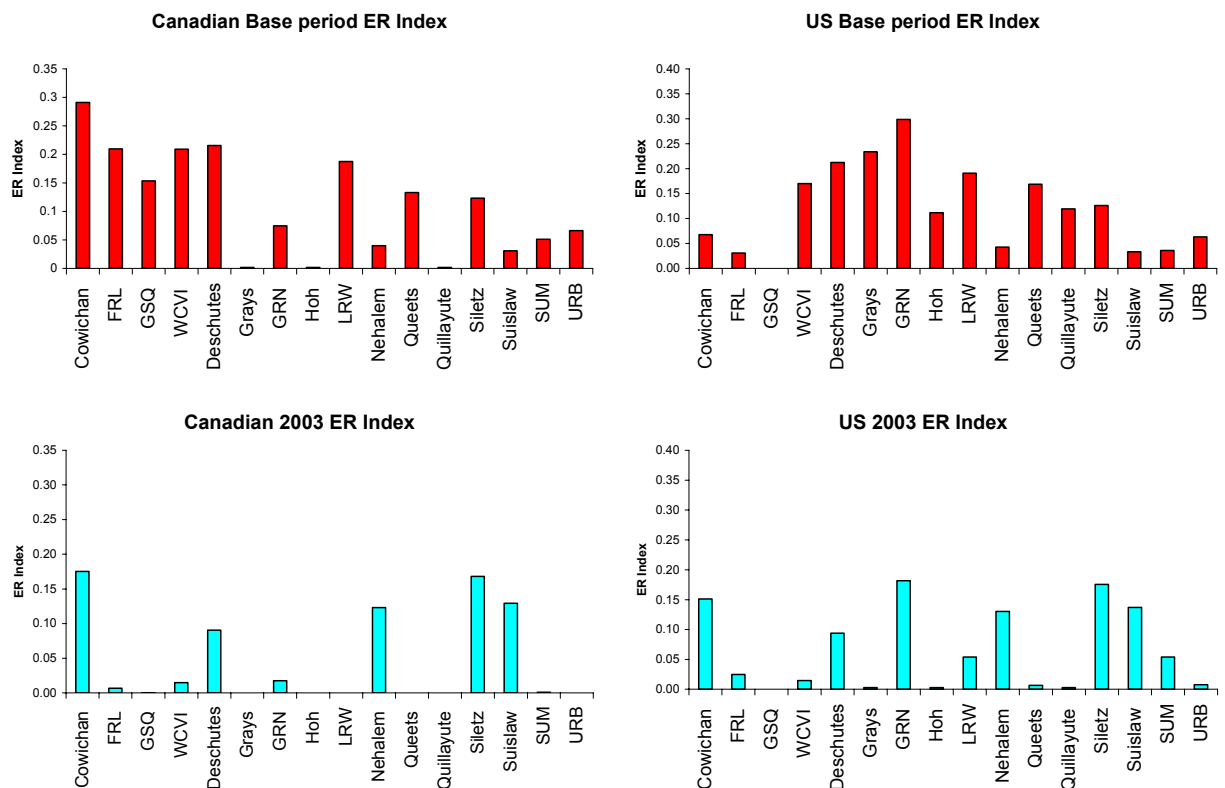
This report has addressed the primary two objectives. The first few chapters review the current data, methods and algorithms in computing these indices for the US and Canada. In addition, this report identifies numerous limitations of the ISBM indices. These are:

- Logistical problems on data reporting exist as the model based indices are followed by post-season evaluation using coded wire tags (CWT's) two years later. Tagged data takes a while to process and input into the centralized data base, Regional Mark Information System (RMIS). As a result, if a stock fails to meet its escapement goal, it is not until two years after the fisheries have occurred that we can assess whether we met the target ISBM objectives.
- A pre-season versus post-season analysis was performed on stocks which had both sets of data (19 stock composites, as some stocks in Canada have only one index for 5-7 stocks (e.g. WCVI (7) & Upper Georgia Straits (5)), out of a possible 41 stocks). The indices tracked one another fairly consistently but in some cases (Green River, Washington coastal stocks, Oregon coastal stocks, Cowichan and Upper Georgia Straits) had a correlation coefficient that was in the opposite direction. For the same identified stocks, the post season versus pre-season data was highly biased. For most Canadian stocks, Columbia River (other than Columbia Upriver Summers and Columbia Up River Brights (URBs)), and Oregon coastal stocks, the bias was negative indicating that the post-season evaluation (based on CWT recoveries in fisheries) was generally lower than the pre-season estimate. However, in the case of Washington coastal stocks, Columbia Upriver Summers, Columbia Upriver Brights and the Green River stock, the bias was positive indicating that the post-season estimates were generally higher than the pre-season estimate of the index. However, this should not be a cause of concern so long as the escapement goal is achieved by managers.
- CWT data coverage was generally poor for most stocks and numerous assumptions had to be made to associate different ISBM stocks with other CWT stock exploitation rates in the current

year. To compound this issue, on stocks where data was available the base period data coverage was poor. Only six out of forty-one stocks have complete coverage (CWT data associated with the stock of concern), twenty stocks had indirect coverage associated with another tag code from a system meant to represent the geographical area with an adjustment made to the extreme terminal area harvest rates. Finally, for eight stocks there were issues with base period data coverage and for seven stocks there were no post season tag codes associated with them and the model had to be used to assess performance relative to the ISBM indices.

- Using adult equivalence on incomplete broods as part of the assessment process resulted in a downward bias of the estimated index. This index only stabilizes when all years in the index have a complete brood and this could thus take even longer than the two year lag.

Regardless of these issues, an harvest rate index, formulated as an Exploitation Rate Index (ERI), was generated on stocks where some sort of post-season CWT data were available for both the Canadian and US fisheries. The results are shown below (Figure a).

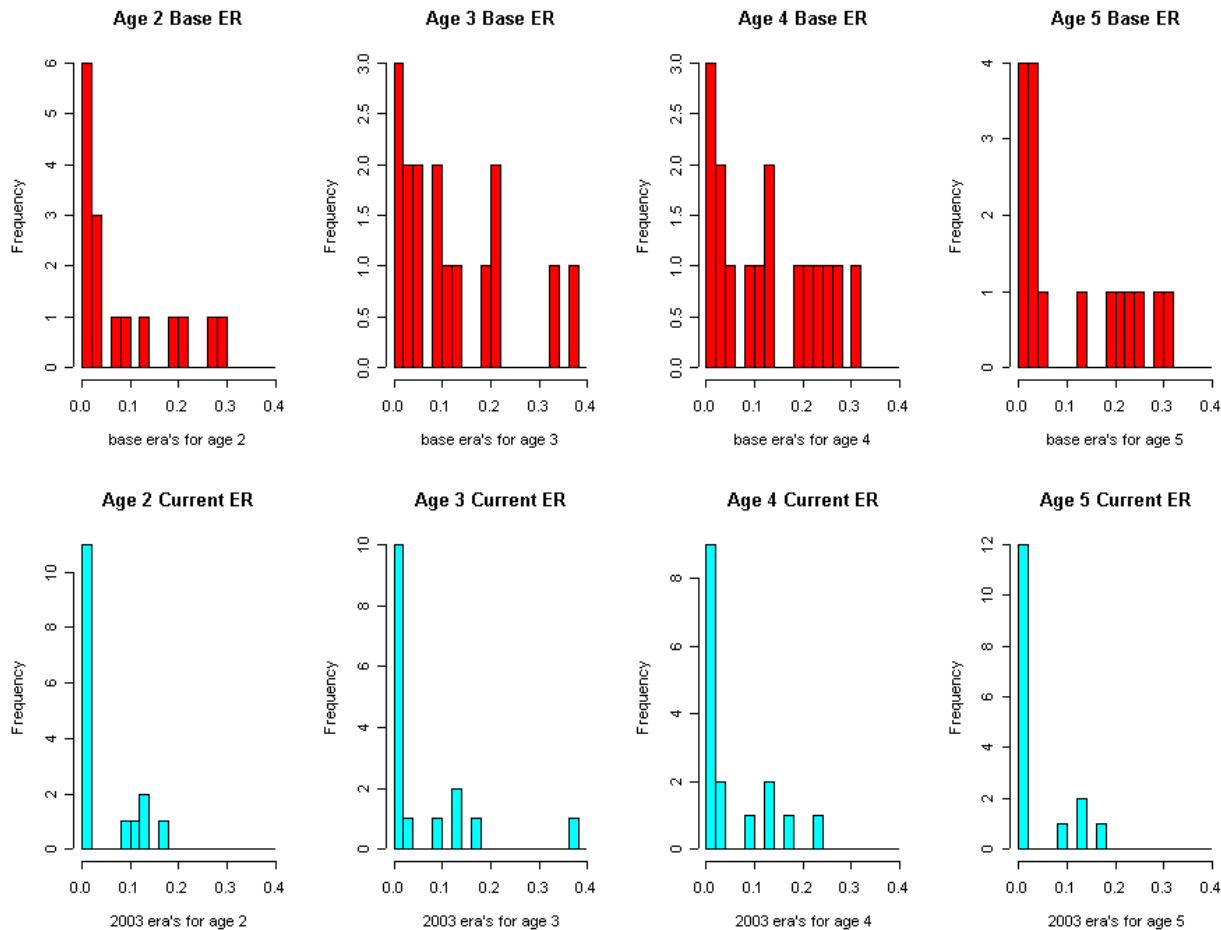


**Figure a: Exploitation Rate Index for different stocks in US and Canadian ISBM fisheries**

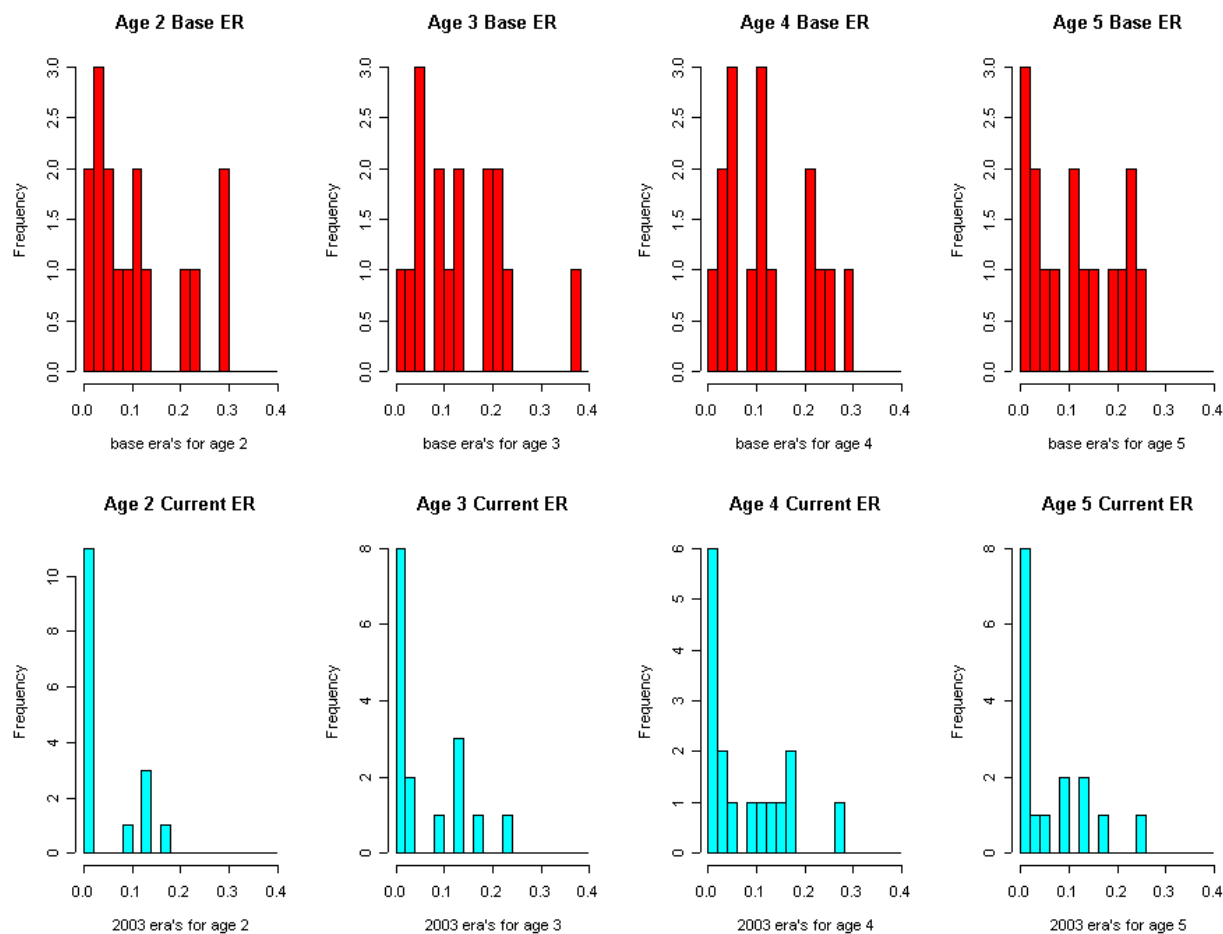
Figure (a) displays a relative index of fishing intensity as an Exploitation Rate Index (ERI) on the set of stocks for which the CTC currently estimates an ISBM index. The figure indicates that Canadian ERI has significantly declined in recent years as compared to their base period, except for the Oregon coastal stocks. In the US, a similar pattern exists though the ERI has increased for certain stocks that had no or negligible fisheries during the base (Nehalem, Siletz, Siuslaw and Columbia upriver Summers). In addition the Cowichan stock shows increased harvest impacts in the US fisheries.



Exploitation rates by age and jurisdiction indicate similar results as the ERI across stocks. Figure b (for Canadian indices) shows a marked drop in exploitation rates by age in 2003 as compared to the exploitation rates for the base period. Figure c (for US indices) displays a drop in exploitation rates for all ages as well. All figures indicate that the mode of the distributions in harvest rates (Figures b and c) have shifted to the left from the base period to the current (2003) year, indicating that the exploitation rates have dropped in these fisheries for those ages even though the overall abundance was high for most Chinook stocks in 2003.



**Figure b: Distributions on Base Exploitation data versus current (2003) exploitation rates by age for Canadian ISBM indices**



**Figure c: Distributions on Base Exploitation data versus current (2003) exploitation rates by age for US ISBM indices**

# 1 INTRODUCTION

## 1.1 INDIVIDUAL STOCK BASED MANAGEMENT INDEX BACKGROUND.

Paragraph 2(b) and Paragraph 4 in the Chinook Chapter (Pacific Salmon Treaty 1999) directly relate to managing fisheries to an ISBM index. These paragraphs detail that certain Chinook fisheries should be responsive to the ISBM index until those fisheries are managed to meet agreed escapement objectives and describe additional harvest measures to respond in cases where the agreed escapement objectives of stock groups listed in Attachment I-V are not met over time. In particular, paragraph 4(b) states:

*The Parties agree that in respect of ISBM fisheries:*

- (a) their intent is that the fisheries shall be managed over time to contribute to the achievement of MSY or other agreed biologically-based escapement objectives;*
- (b) until such times as the ISBM fisheries are managed to meet those escapement objectives, and unless otherwise recommended by the CTC, the non-ceiling index defined in TCCChinook (96)-1 (February 15, 1996) will be used to measure performance of ISBM fisheries;*
- (c) the non-ceiling index for ISBM fisheries will be computed pre-season based on forecasted abundance and fishing plans and evaluated post season for each of the escapement indicator stocks listed in Attachments I to V to this chapter;*
- (d) for the purposes of this paragraph, until agreed escapement objectives for the stock groups listed in Attachments I to V to this Chapter have been achieved, Canada and the United States shall reduce by 36.5 and 40 percent respectively, the total adult equivalent mortality rate, relative to the 1979-82 base period, in their respective ISBM fisheries that affect those stock groups. The reduction identified in this sub-paragraph shall be referred to as the “general obligation”.*

At present, we compute ISBM indices, but the data and the methodologies utilized by the Chinook Technical Committee-Analytical Work Group (CTC-AWG) have not been presented to the Chinook Technical Committee (CTC) for each and every stock of relevance. This project will document the existing ISBM Index for certain stocks that are directly relevant to implementing the Pacific Salmon Treaty.

For the Individual Stock Based Management (ISBM) fisheries, the 1999 Agreement requires the CTC to compute an ISBM exploitation rate index by country for a number of stocks or stock groups. Per the agreement, the index is computed using the formula defined by the CTC in 1996 as a Non Ceiling index (NCI). The NCI is the ratio of the total mortalities (in adult equivalents or AEQs) inflicted on a stock by a country's ISBM fisheries in the current year divided by the total mortalities that would have occurred under base period exploitation rates. The formulas for the index are:

$$ISBMIdx_{s,y} = \frac{\sum_{i=1}^F \sum_{a=2}^5 (Catch_{s,i,a,y} * AEQ_{s,i,a,y})}{\sum_{i=1}^F \sum_{a=2}^5 (BPER_{i,a} * Cohort_{s,i,a,y})} \quad (1)$$

where:

- i) ISBM is the Individual stock based Management Index for stock s, a is age, y is year and i is the fishery of concerns effecting the stock.
- ii) The AEQ stands for Adult Equivalence for stock s at age a, and fishery i at time y, and

- iii) the Cohort is the cohort size for stock  $s$ , by age and fishery after natural mortality has occurred at that age.
- iv) catch is in terms of total mortality or catch is the sum of Legal catch, shaker mortality, Chinook non retention, legal and sublegal Mortality.

$$BPER_{s,i,a} = \frac{\sum_{y=79}^{82} \frac{(Catch_{s,i,a,y}) * AEQ_{s,i,a,y}}{Cohort_{s,i,a,y}}}{4} \quad (2)$$

where BPER is the Base Period Exploitation Rates are the average exploitation rate for stock  $s$  and fishery  $i$  in AEQ terms.

This index computed compares an ‘expected’ AEQ mortality (assuming base period exploitation rates and current stock abundance) with the observed AEQ mortality on a stock within a calendar year, over all non-ceiling fisheries of a party. Index values less than 1.0 indicate that the exploitation rates have decreased relative to the base period. The agreement obligates Canada and the United States to reduce the exploitation rate from the base period by 36.5% and 40% respectively in fisheries on stocks of concern that are not meeting their escapement goal. The exploitation rate adjustment does not apply to stocks or fisheries where stocks have achieved their CTC agreed escapement goal. A total of eight and seven stock groupings were identified for Canada and the US respectively for determining compliance with ISBM provisions. Because the indices are applicable only to wild stocks listed in the agreement, and since some ISBM fisheries tend to be terminal (as opposed to mixed stock) by their nature and require a finer resolution than the CTC model currently provides, direct application of the CTC model or CWTs alone is not possible in the computation of the indices.

## 1.2 ISBM IN RELATION TO FISHERY STRUCTURE

**Table 1. Fisheries included in the ISBM Index by nation.**

Fisheries Included in ISBM Index	
United States	Canada
Washington/Oregon Ocean Troll (Fishery 5)	West Coast Vancouver Island Net
Puget Sound Northern Net	Strait of Juan de Fuca Net
Puget Sound Other Net	Johnstone Net
Washington Coastal Net	Fraser Net
Washington Ocean Sport (Fishery 21)	Strait of Georgia Troll, Net, and Sport
Puget Sound Northern Sport	North BC mainland sport, and Central BC Sport
Puget Sound Southern Sport	North and Central BC Net
Freshwater Terminal Net	Central BC Troll
Freshwater Terminal Sport	Freshwater BC Net and Sport

Table 1 shows the fisheries that are used in computing this index by US or Canadian waters. For each of the stocks shown in the Chinook Chapter of the Pacific Salmon Treaty (PST 1999), indices are computed by these fisheries, and are stock specific.

Since these indices computed are directly related to the fishery management in these areas, indices that are stock specific need to be estimated before and after the fishery takes place. In the first case, i.e. preseason, the CTC Chinook model is used along with external assumptions about harvest rates to

compute these indices. In the latter, i.e. postseason, Coded Wire Tags (CWTs) associated with certain stock groups are used to determine the index.

### 1.3 Pre-season Management and the ISBM Index

**Table 2. Stock Groups and Model stock associations used to calculate the preseason ISBM.**

<b>Stock Group</b>	<b>ISBM Stock</b>	<b>Model Stock for Base Period Exploitation Rate</b>
Lower Strait of Georgia	Cowichan Nanaimo	GST
Fraser Late	Harrison	FRL
North Puget Sound Natural Spring	Nooksack Spring Skagit Spring	NKS NKS
Upper Strait of Georgia	Klinaklini Kakweikan Wakeman Kingcome Nimkish	GSQ
Fraser Early (springs and summers)	Upper Fraser Mid Fraser Thompson	FRE
West Coast Vancouver Island Falls	Artlish Burman Gold Kauok Tahsis Tashish Marble	RBT
Puget Sound Natural Summer/Falls	Skagit Stillaguamish Snohomish Lake WA Green River	SKG STL SNO PSN PSN
North/Central BC	Yakoun Nass Skeena Area 8	NTH
Washington Coastal Fall Naturals	Hoko Grays Harbor Queets Hoh Quillayute	WCN
Col River Falls	Upriver Br Deschutes Lewis	URB URB LRW
Columbia River Summers	Mid-Col Summers	SUM

Far North Migrating Oregon Coastal Falls	Nehalem Siletz Siuslaw	SRH
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The Chinook Model structure models fisheries as either ceiling fisheries or Fishery Policy (FP) control fisheries. In the first case, a ceiling is specified and associated stock specific catches and incidental mortalities are estimated in the fishery based on stock abundance and the size of the fishery in relation to the base period. In the second case, an FP control specifies the harvest rate in relation to the base and thereby allocates the overall catch and incidental mortality in those fisheries. Most of the approaches for forecasting an ISBM index preseason assume a certain harvest rate in relation to the base for the specified fishery and generates associated catches for those fisheries and stocks which are then used in computing the index. The model stocks associated with the specific individual ISBM stocks, the stock groupings are shown in Table 2.

#### 1.4 Post-season Management and the ISBM Index

**Table 3. Coded Wire Tag stocks associated with computing the ISBM Index post season.**

Stock Group	ISBM Stock	CWT Stock
Lower Strait of Georgia	Cowichan Nanaimo	Cowichan Big Qualicum River
Fraser Late	Harrison	Chilliwac
North Puget Sound Natural Spring	Nooksack Spring Skagit Spring	Nooksack Spring N/A
Upper Strait of Georgia	Klinaklini Kakweikan Wakeman Kingcome Nimpkish	Quinsam
Fraser Early (springs and summers)	Upper Fraser Mid Fraser Thompson	N/A
West Coast Vancouver Island Falls	Artlish Burman Gold Tahsis Tashish Marble	Robertson Creek
	Kauok	
Puget Sound Natural Summer/Falls	Skagit Stillaguamish Snohomish	N/A Stillaguamish Fall Fing N/A
	Lake Washington Green River	N/A South PS Fall Fingerlings
North/Central BC	Yakoun Nass Skeena Area 8	N/A

Washington Coastal Fall Naturals	Hoko Grays Harbor Queets Hoh Quillayute	Hoko Queets Queets Queets Queets
Col River Falls	Upriver Brights Lewis	Upriver Bright Lewis River Wild
	Deschutes	Upriver Bright
Columbia River Summers	Mid-Columbia Summers	Columbia Summers
Far North Migrating Oregon Coastal Falls	Nehalem Siletz Siuslaw	Salmon River Hatchery Salmon River Hatchery Salmon River Hatchery

Table 3 displays the stocks that are used to compute the ISBM index post-season. However, each of these stocks do not have a unique tag code and therefore assumptions of relating a tag code to the stock of concern are made [described in the post-season section]. These assumed relations used often create complications as the tag code may reflect a different harvest rate than what is observed on the stock of concern. Therefore adjustments are made to some of the recoveries in an attempt to correct for this difference. Another complication arises if the stocks were not tagged in the base period, as there is no base period exploitation rate to relate to the current cohort exploitation rate (also described in the post-season section).

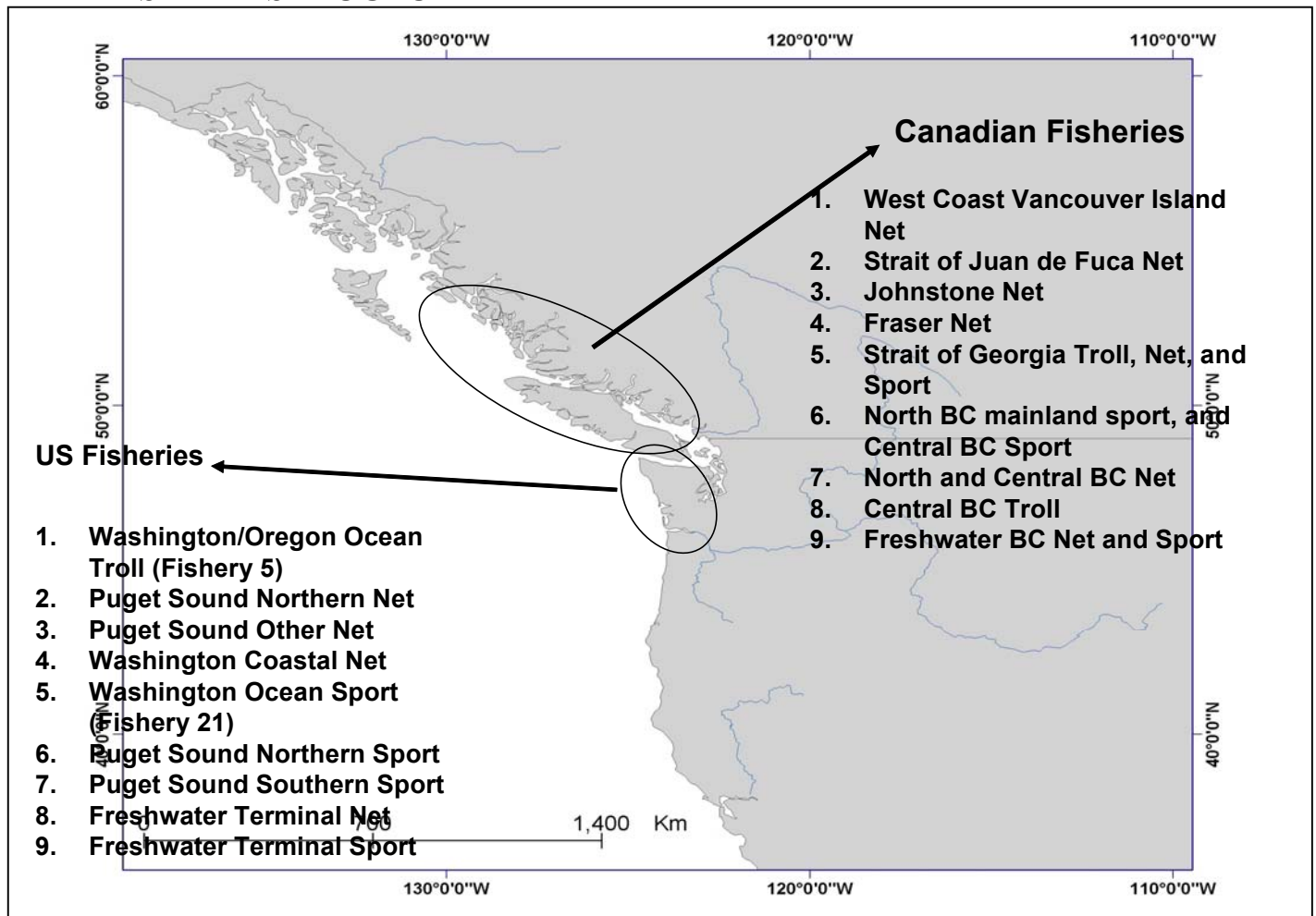
## 1.5 OBJECTIVES OF THIS ANALYSIS

Due to the inherent assumptions used in computing these indices preseason and postseason, the ISBM has not been uniformly applied across all fisheries and stocks, making it useful for discussion purposes to document the assumptions made for computing these indices preseason and post season on a case by case basis. The objectives of analyzing the methodologies used to calculate Individual Stock Based Management (ISBM) indices are:

1. To document the source of data that is used to compute the ISBM indices for each of the 41 stocks identified in Attachment V of the Chinook chapter.
2. To document the assumptions used in computing the indices pre- and post-season for each of these stocks, and the procedures used in the extracting the data from the model or CWT data.
3. On a case-by-case basis, to analyze potential issues with existing indices and to propose alternatives approaches that could be used for fishery management where agreed escapement objectives are not being met over time.

This report will only focus on the first 2 objectives, the third objective will be addressed at a later period.

## 2 FISHERY STRUCTURE

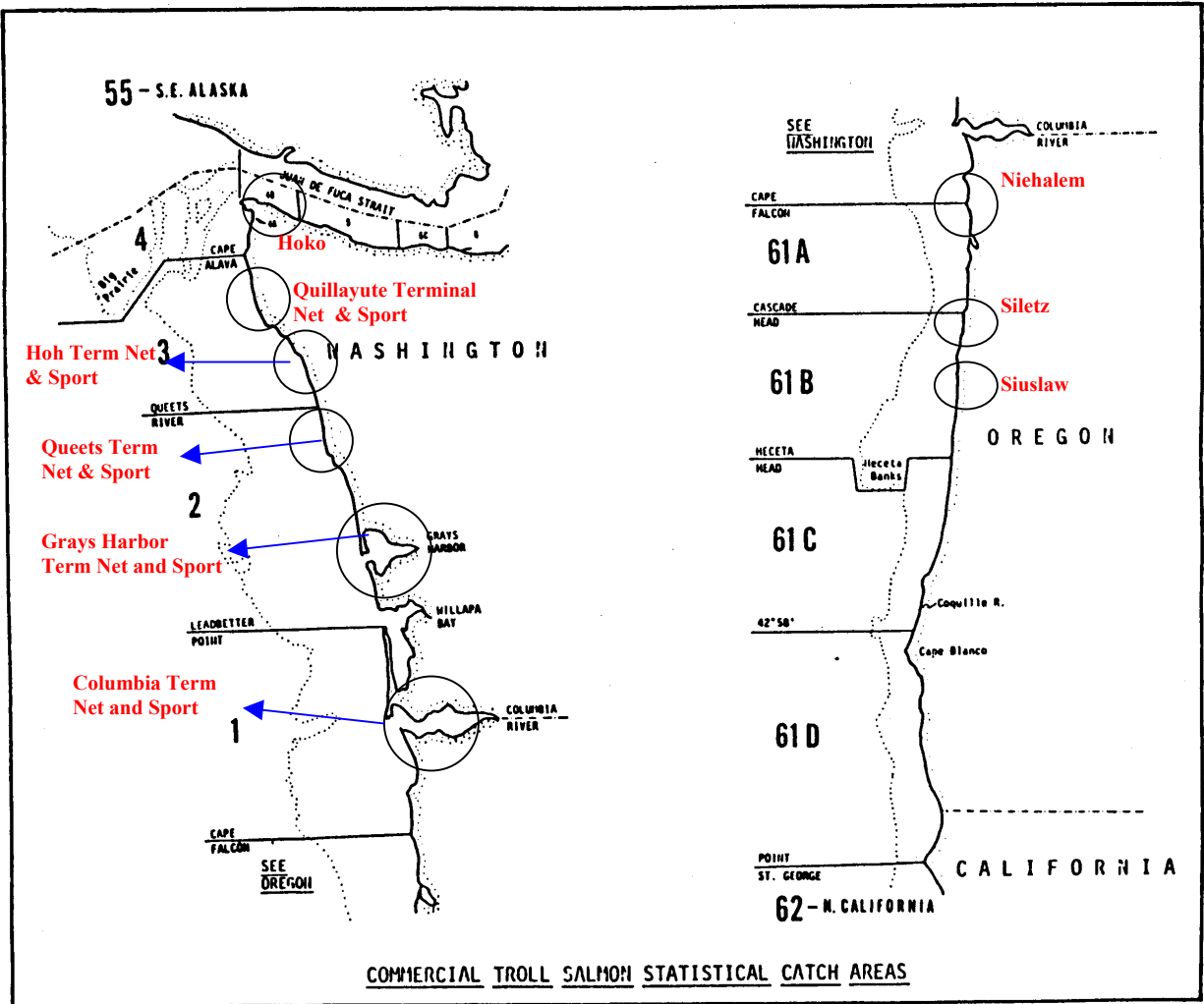


**Figure1: General Area and list of US and Canadian ISBM Fisheries**

Most of the fisheries included in this structure are extreme terminal area fisheries or fisheries that are known to impact a larger portion of the terminal area stocks. Hence (as shown in Fig 1) most stocks in the ISBM tables (Table 2 and 3) impacted are in the general vicinity of where the fisheries are occurring.

### 2.1 SOUTHERN US ISBM FISHERIES





**Figure2: Map of US ISBM Fisheries on the coastal troll coastal sport, and in coastal terminal areas**

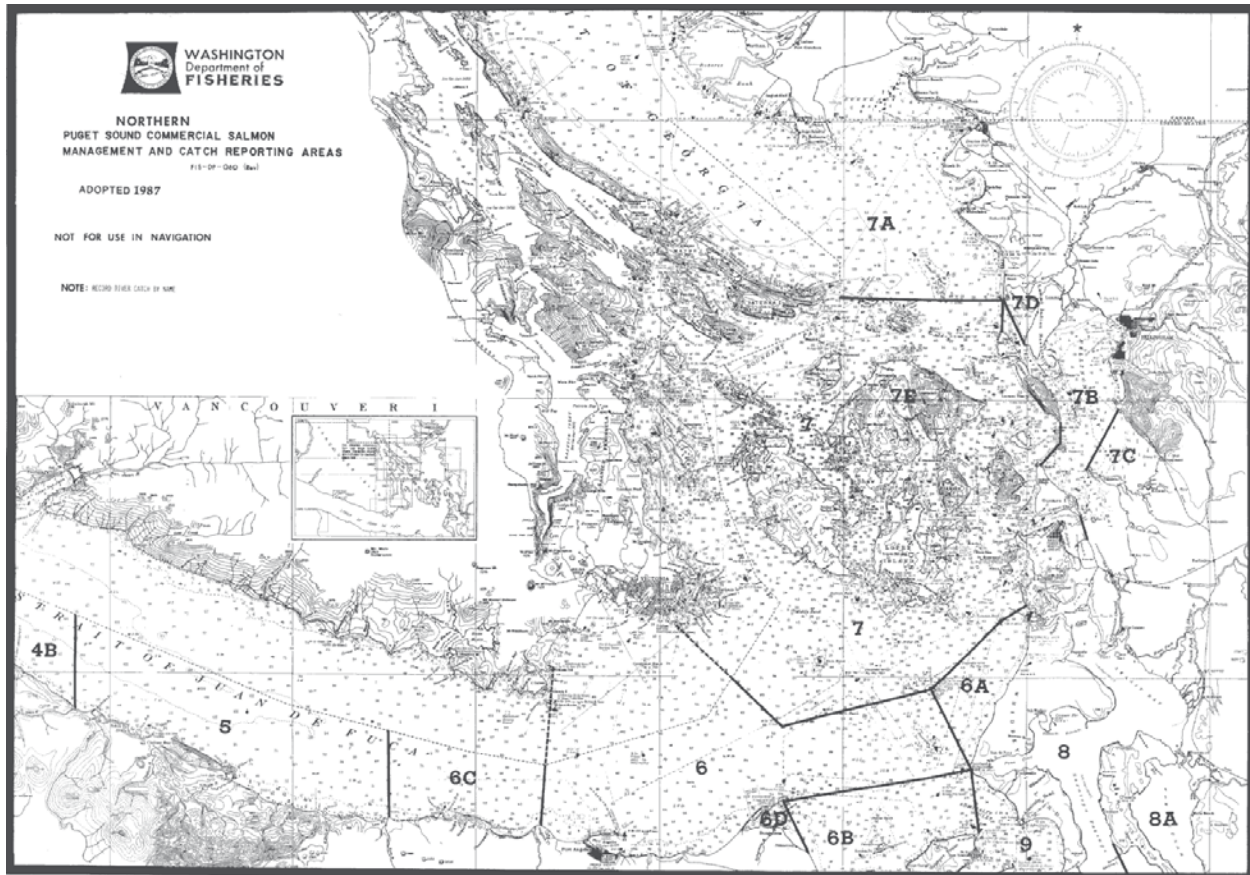
### 2.1.1 Washington/Oregon/California Ocean Troll

Even though the fishery operates on the entire ocean coast of California (figure 2 above), Oregon and Washington, the primary fishery for the ISBM index calculations is from North of Cape Falcon to the US-Canada border. Primary fishing occurs in May through mid September depending on the quota size.

Most fishing is done with lures or bait with single point, single shank barbless hooks. Primary targets for Chinook are Columbia River fall Chinook stocks and Sacramento River fall Chinook stocks. Due to both weak stocks and Endangered Species Act (ESA) management concerns, the North of Cape Falcon fishery for the last several years have been much smaller than base period years.

For the other areas, i.e. From Humbug Mountain (Coos Bay) to Horse Mountain, California, fishing occurs from March through October but is limited with small quotas in order to minimize impacts on Klamath Chinook or California Coastal Chinook stocks. From Horse Mountain, California, to Point Arena, California, fishing occurs from March through October time frame but is limited to minimize Klamath Chinook or California Coastal Chinook impacts. From Point Arena, California, to U. S.-Mexico Border, fishing occurs from April through October, with some time off or areas closed to limit harvest impacts on lower Klamath Chinook, Winter Chinook or California Coastal Chinook.

### 2.1.2 Puget Sound Northern Net



**Figure3: Map of Northern Puget Sound US ISBM Fisheries**

Areas 6A, 7 and 7 A (figure 3 above) have both treaty and non-treaty net fisheries operating. Most fisheries operate using drift gillnets. These fisheries are now managed for significantly lower exploitation rates compared to base period exploitation rates in order to address weak stock and ESA management concerns. In addition, for the Nooksack, Skagit, Green, Skykomish and Lake Washington stocks, terminal area fisheries occur along with these Puget Sound net fisheries. Most fisheries occur in the summer and fall months, i.e. from June through September, though in recent years, due to ESA restrictions, these fisheries have been severely limited to the latter parts of July and August only.

### 2.1.3 Puget Sound Other Net

All other net fisheries in Puget Sound go into this category. Southern net fisheries such as the fisheries off the Nisqually River come under this category as do fisheries in Elliott Bay (near Seattle). These fisheries occur at the same time as northern Puget Sound net fisheries, but again, due to ESA restrictions, these fisheries have been severely curtailed in recent years.

### 2.1.4 Washington Coastal Net

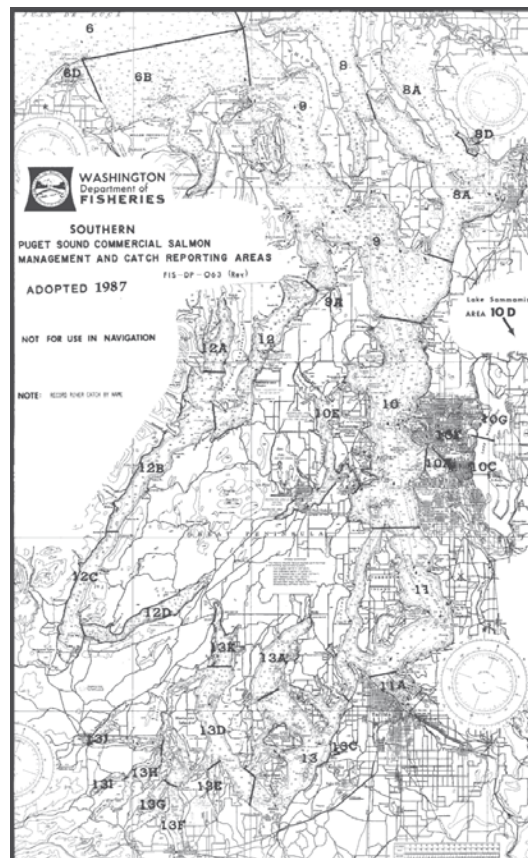
These include net fisheries operating in Areas 1 through 4 (figure 2 above). However, these are practically non-existent in current years as compared to the base years.

### 2.1.5 Washington/Oregon/California Ocean Sport

As in the Washington/Oregon/California troll fishery, the sport fishery covers the entire ocean coast of California, Oregon and Washington (Figure 2). However, the primary fishery of concern is that which occurs from Cape Falcon, Oregon, to the U.S.-Canada border. Sport fishing occurs here in late June through September depending on the quota size.

Other areas open fisheries from Cape Falcon Oregon to Humbug Mountain (Coos Bay), where fishing occurs from March through October. From Humbug Mountain (Coos Bay) to Horse Mountain, California, fishing occurs during the May through September time frame and is limited with time closures to avoid lower Klamath Chinook or California Coastal Chinook. From Horse Mountain, California to Point Arena, California, fishing occurs from February through November time frame and has limited time closures to avoid lower Klamath Chinook or California Coastal Chinook impacts. Finally from Point Arena, California to the U.S.-Mexico Border, fishing occurs from April through October or (November in San Francisco) time frame with some time or areas closures to avoid lower Klamath Chinook, Winter Chinook and California Coastal Chinook stocks. In all areas, lures or bait with single point, single shank barbless hooks is the required gear. The effort and exploitation rate is highly variable though generally much smaller in recent years as compared to the base years due to weak stock and ESA management concerns.

### 2.1.6 Puget Sound Northern Sport



**Figure 4: Map of Fishing areas that map to the Puget Sound Net and Sport fisheries**

These include Area 5 (figure 3) Area 6 (Figure 4), Area 7 (Figure 3) and Area 9 (Figure 4). As in the ocean sport fisheries, effort has largely been reduced due to concerns on Puget Sound ESU being listed as threatened under the ESA. The gear used is mostly lures or bait with single point, single shank barbless hooks. In recent years Area 5/6 fishery has become a mark-selective fishery targeting only mass-marked hatchery Chinook to lessen the impacts on the wild Puget Sound listed ESU.

#### **2.1.7 Puget Sound Southern Sport**

All other sport fisheries in Puget Sound (Figure 4 above) are put into this category. These include all estuary area sport fisheries that occur at the mouths of the Skagit, Elliot Bay, Nooksack, Green River, etc.

#### **2.1.8 Freshwater Terminal Net**

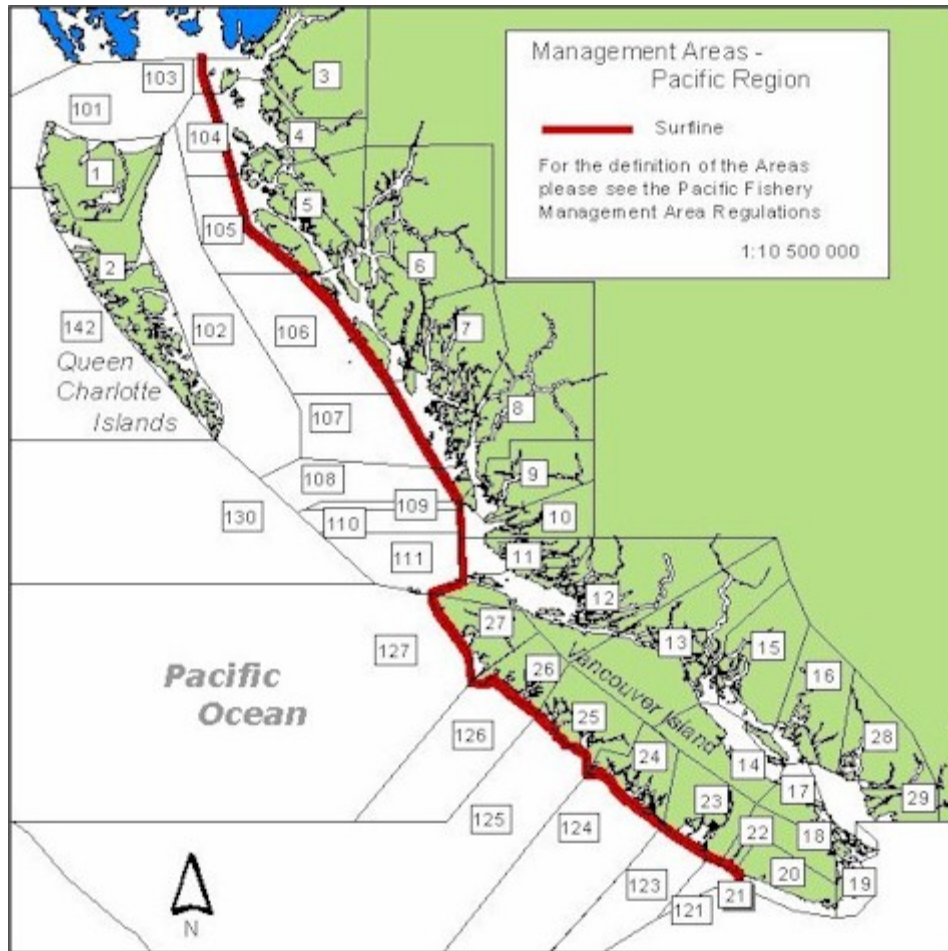
There are a number of freshwater terminal net fisheries. These include the Nooksack, Skagit, Stillaguamish, Snohomish, Grays Harbor, Queets, Quillayute, Hoh, Hoko, the Green River and the Columbia River (figure 2 above). Most fisheries use gillnets and operate during the upriver migration timing in August through September for fall (ocean type stocks). For spring Chinook stocks (Columbia, Nooksack and Skagit) the fisheries occur in April through June. Exploitation rates vary with run size, and management objectives for the stock of concern. In recent years due to increased abundances exploitation rates are higher as compared to the early and mid 1990's.

#### **2.1.9 Freshwater Terminal Sport**

As is the case for terminal net fisheries, most terminal sport fisheries occur in each of the rivers identified above, namely the Nooksack, Skagit, Stillaguamish, Snohomish, Grays Harbor, Queets, Quillayute, Hoh, Hoko, the Green River and the Columbia River (figure 2 above). In addition, for the Oregon coast we have fisheries occurring in the Nehalem, Siletz and Siuslaw Rivers. Fisheries occur during the upriver migration timing from August through September for fall run Chinook and from April through June for spring run Chinook. Most fisheries use lures or bait with single point, single shank barbless hooks. In addition, in recent years numerous terminal area fisheries have become mark-selective (Columbia Spring Chinook) to decrease the impacts on ESA listed stocks.

### **2.2 CANADIAN ISBM FISHERIES**





**Figure 5: Map of Fishing areas that map to the Canadian ISBM fisheries**

### **2.2.1 West Coast Vancouver Island Net**

While this fishery includes all net catch in Areas 21-27 (Figure 5) on the WCVI, it is now only terminal in nature, and primarily targets hatchery stocks in Barkley Sound (Robertson Cr.), Nitmat Lake (Nitnat River) and Nootka Sound (Conuma River). During the 1979-1982 period, net fisheries were a significant harvester of Chinook on the WCVI. However, catch declined precipitously in the mid to late 1990s as abundance of WCVI Chinook declined. Only the Barkley Sound fishery intercepts ISBM stocks, and even there, only the Robertson Cr. Stock

### **2.2.2 West Coast Vancouver Island Inside Sport**

This fishery includes sport catch that occurs inside the surf line for Areas 21, 23 and 24 (figure 5) from August 1-October 15, and Areas 25-27 from July 1-October 15. During the base period 1979-1982, sport catch was not separated by 'inside' versus 'outside' (which is included in AABM catch). Consequently, it isn't known what portion of the total WCVI sport catch was 'inside' during that time. However, while recent catch in this fishery has accounted for 50,000 Chinook, only those fisheries in the Barkley Sound impact an ISBM stock, namely Robertson Creek.

### **2.2.3 Strait of Juan de Fuca Net**

This fishery includes net catch in Area 20 only (Figure 5). This fishery landed in the order of 5,000-10,000 Chinook during the 1979-1982 base period. However, due to conservation concerns for both Canadian and southern U.S. Chinook stocks, this fishery has been restricted to less than 400 fish annually since the mid 1990s. Consequently, it does not have a significant impact on ISBM stocks.

#### **2.2.4 Strait of Juan de Fuca Sport**

This fishery occurs in Areas 19B and 20 (Figure 5), and has consistently harvested 20,000 to 40,000 Chinook annually. Much of the catch is landed during the late fall and winter. This fishery intercepts ISBM stocks from both Canada and the U.S. to a moderate degree.

#### **2.2.5 Johnstone Strait Net and Troll**

The net fishery includes net catch in Areas 11-13 (Figure 5), while the troll fishery includes catch in Area 12 only. During the base period, these fisheries landed combined catch of approximately 50,000 Chinook annually. However, both fisheries were essentially shut down in the mid 1990s due to conservation concerns for Georgia Strait Chinook stocks. Currently, only a couple of hundred Chinook are landed as bycatch in net and troll fisheries directed at other species, and therefore have small impacts on Canadian and U.S. ISBM stocks.

#### **2.2.6 Fraser Net**

While historically, in-river catch of Fraser Earlies ('reds') and Falls ('whites') has been high, only fisheries in the lower river intercept Fraser River falls ('whites'), the only ISBM stock in the Fraser watershed. Catch in this fishery has declined by an order of magnitude in more recent times, and represents a small component of the total harvest on this stock group.

#### **2.2.7 Strait of Georgia Troll, Net, and Sport**

The troll fishery includes Areas 13-19 and 29 (Figure 5). The sport fishery includes Areas 13-19A, 28 and 29 (figure 5), while the net fishery covers Areas 13-16 (Figure 5). All of these fisheries were large during the 1979-1982 base period, typically intercepting over half a million Chinook annually in total. Several Canadian ISBM stocks, as well as a number of U.S. ISBM stocks were intercepted to a significant degree by these fisheries. However, since conservation concerns for Georgia Strait Chinook stocks first were raised in the mid 1980s, catch has declined significantly. Currently, there are no Chinook-targeted troll or net fisheries, and the sport fishery harvests less than 10% of what it did in the early 1980s. Consequently, the impact of Georgia Strait fisheries on ISBM stocks today is far less than it was during the base period.

#### **2.2.8 North BC mainland sport, and Central BC Sport**

While this fishery represents all sport fisheries from Areas 3-10 (Figure 5), significant sport fisheries occur only in Areas 3, 4, 6, 8 and 9 (Figure 5). All but the Area 6 fishery intercept moderate numbers of CWTs from ISBM stocks, both Canadian and U.S. These fisheries have increased moderately from levels during the base period.

#### **2.2.9 North and Central BC Net**

While this fishery represents net fisheries from Areas 1-10 (Figure 5), currently, significant fisheries occur only in Areas 3, 4 and 8. Catch has declined considerably since the base period, as net fisheries in

these areas were moved to more in-shore locations. While these fisheries can intercept both Canadian and U.S. ISBM stocks, they do so now only to a small degree.

#### **2.2.10 Central BC Troll**

This fishery, which occurred in Areas 6-10 (Figure 5), used to land close to 100,000 Chinook annually during the base period. However, with the advent of the Pacific Salmon Treaty, and domestic conservation concerns, this fishery was essentially shut down by the late 1990s. While it once intercepted both Canadian and U.S. ISBM stocks to a significant degree, this fishery currently harvests only small numbers of ISBM stocks

#### **2.2.11 Freshwater BC Net and Sport**

With the exception of Fraser River in-river gillnet fisheries, freshwater net fisheries in B.C. rivers are minor sources of catch in any system where they occur. None significantly impact Canadian ISBM stocks. Significant in-river sport fisheries occur in the Fraser and Skeena Rivers. However, only the fishery in the former impacts an ISBM stock (Fraser Lates), and only to a small degree.

### 3 PRESEASON COMPUTATIONS OF THE ISBM

All the data presented in this report is from Calibration Run 0308 (TC-Chinook 03-2) that was published in 2003. Also Figures 6 and 7 have equations with numbers that map to corresponding tables with data in the Appendices for each region (Figure 6 and Figure 7 and Appendices).

As most of the stock groups used in computing the ISBM index do not have a one to one correspondence with the stocks in the model, a number of external sources of data are used for computing these indexes pre-season. The most current and best available data is used to generate these indices, but often these methods make gross assumptions about the distributions and similarities between different stocks and fisheries.

The methods generally rely on the following assumptions:

1. External stock specific harvest rates in terminal fisheries such as Puget Sound and Columbia River are taken from the Pacific Fisheries Management Council (PFMC) process through the Fisheries Regulation Assessment Model (FRAM MEW 2003) or in-river harvest models.
2. In cases where no data is available for the preseason management process, estimates of in-river harvest are made by looking at an average time-series of harvest rates observed on specific systems
3. In cases where model stocks are not representative of the individual stock of concern, external estimates of harvest rates in particular fisheries are made. New FP scalars are computed, a new model run is made for the stock of concern and a new ISBM index is computed for that stock.

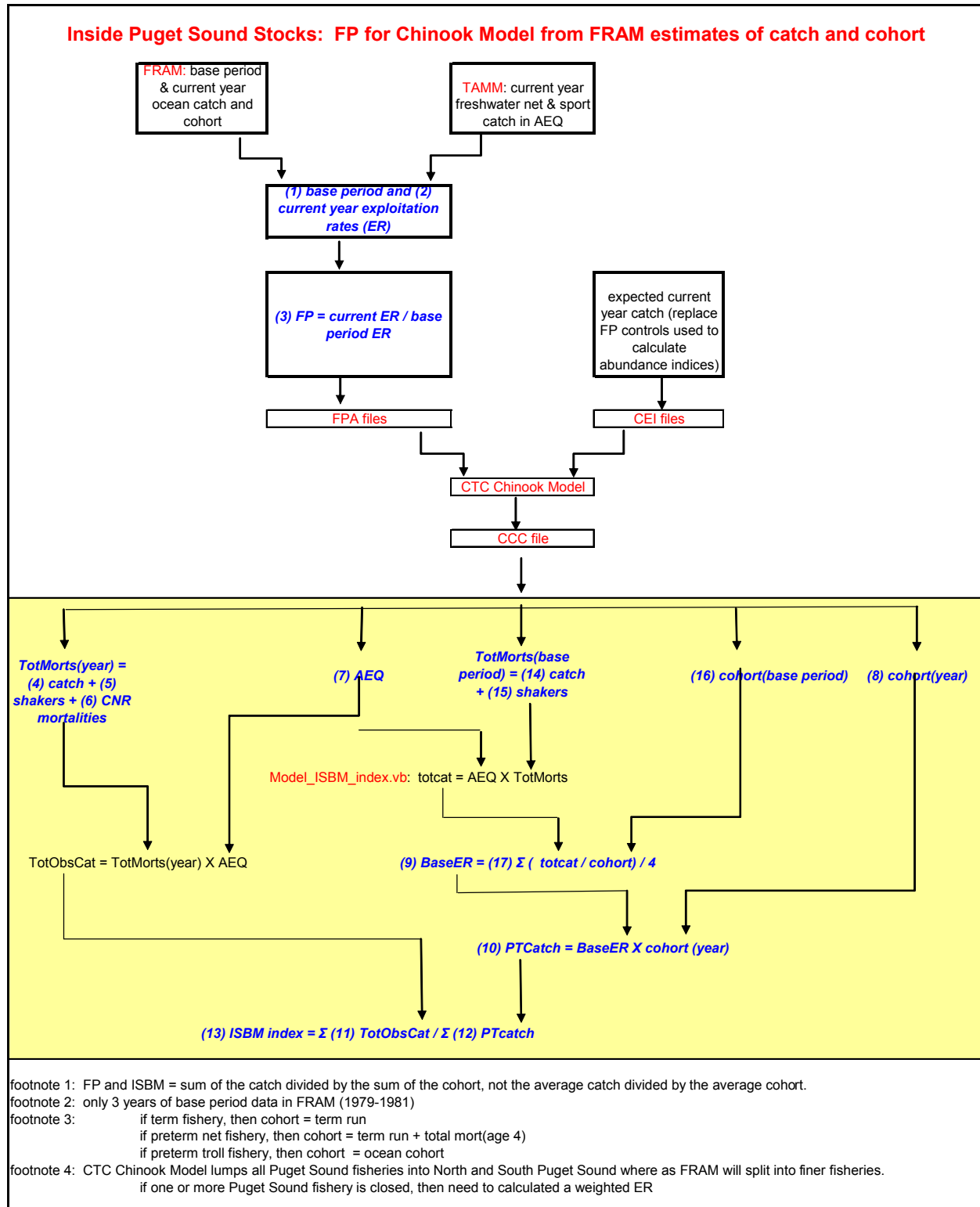
#### 3.1 COMPUTATION FLOW AND LOGIC FOR PRESEASON INDICES GENERATED FROM THE CTC MODEL

Based on the above mechanisms the logic and flow of computing the ISBM Index for stocks from the Fisheries Resource Assessment Model, FRAM (MEW 2003) is shown below:

##### 3.1.1 Inside Puget Sound

Puget Sound Fisheries catches by stock are computed in the southern US management process, namely through the FRAM (MEW 2003), the Terminal Area Management Models (TAMM) managed between the state of Washington and the tribes. These models have their own intricacies, but have a finer spatial resolution and structure than the PSC Chinook model. The finer level detail within Puget Sound is mapped through the FRAM (Figure 6). Harvest rates and catches are computed for Puget Sound stocks, namely Green River, lake Washington, Snohomish, Stillaguamish and Skagit river externally through the FRAM. The fisheries that are looked are Washington Troll (WATR), North Puget Sound Net (NPSN) and North Puget Sound Sport (NPSS). Washington Troll are namely mapped from areas 1 to 4 though most Puget Sound fish are encountered in areas 4 and 4b in the Treaty and Non-Treaty Trolls. Within Puget Sound areas 7, and 7A are mapped to North Puget Sound Net. North Puget Sound Sport consist of Areas 5, 6, 7 and 9. All the other Puget Sound Fisheries are mapped to South Puget Sound Net (SPSN) and South Puget Sound Sport respectively (SPSS) (see Appendix A). Once these are generated, they are used to compute external FP files that go into the Chinook model, and then the Index (Figure 6). In addition to that a new ceiling file with expected catches is generated that is also used in a projection run for the model.





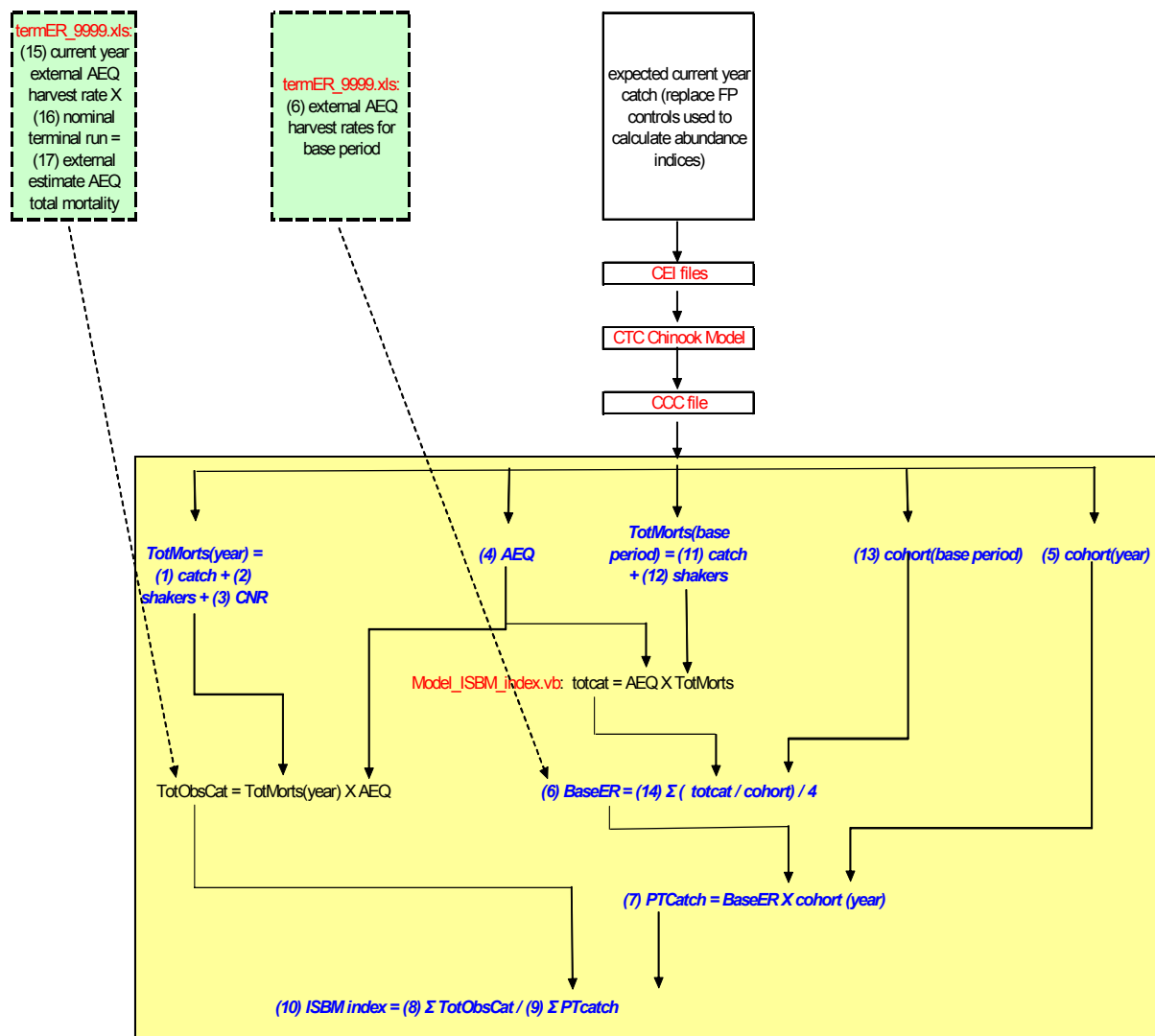
**Figure 6: Computation Flow from the PFMC FRAM model to the CTC Model for external harvest rates for Puget Sound Stocks in order to compute an accurate stock specific ISBM index**

### **3.1.2 External harvest rate estimates for stocks not in the model**

For numerous stocks in the model, external harvest rates for certain fisheries are available (namely in river terminal net and sport fisheries of the stock of concern, e.g. Queets, Hoh, Nehalem, Siletz, etc). For those stocks external harvest rate estimates are used and overwrite the model generated harvest rates to compute the overall catch for those fisheries for which these estimates are available (figure 7). For the rest of the fisheries, the model is used. The flow structure is illustrated below showing how the external harvest rates are used with the model generated estimates to compute an overall Index. Stocks where this methodology is utilized are the Cowichan, Nanaimo, Harrison, WCVI natural stocks, Northern British Columbia, Washington Coast, Oregon coast and the Columbia River.

Table 4 indicates the stocks and the methods used to compute these indices preseason. In general in Puget Sound external estimates are taken from FRAM (MEW 2003) incorporated into the Chinook model and then evaluated (Figure 6). For other stocks, either a harvest rate is determined externally for certain terminal areas ISBM fisheries (either terminal net or sport) which then overwrites the harvest rate in the model based terminal net or sport, and then computes an index (Figure 7). Finally, for some stocks no manipulation is made to any of the model data, and the index is obtained directly from the model run (Figure 7).

**Columbia River (Lewis River Wild, Upriver Brights, Summer) and Canada (Northern and Central BC, Frasier, Upper Georgia Straits) do not have external input. Washington Coast, Oregon Coast, Columbia River (Deschutes) and Canada (WCVI, Frasier, Lower Georgia Straits) have external input.**



footnote 1: FP and ISBM = sum of the catch divided by the sum of the cohort, not the average catch divided by the average cohort.

footnote 2: Only 3 years of base period data in FRAM (1979-1981)

footnote 3: if term fishery, then cohort = term run

if preterm net fishery, then cohort = term run + total mort(age 4)

if preterm troll fishery, then cohort = ocean cohort

footnote 4: CTC Chinook Model lumps all Puget Sound fisheries into North and South Puget Sound where as FRAM will split into finer fisheries.

if one or more Puget Sound fishery is closed, then need to calculate a weighted ER

footnote 5: Terminal Flag for fishery 15 (terminal net) and 25 (terminal sport) = 1 for all stocks (overwrite the values found in the BSE file)

footnote 6: if Terminal Flag = 1 or Ocean Net Flag = 1 and age >= 4, then AEq = 1

**Figure 7: Computation Flow from externally generated harvest estimates to the CTC Model for generating ISBM indices**

**Table 4: Methods used to calculate the ISBM preseason.**

<b>Stock Group</b>	<b>ISBM Stock</b>	<b>Model Stock</b>	<b>Method</b>
Lower Strait of Georgia	Cowichan Nanaimo	GST	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file
Fraser Late	Harrison	FRL	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file
North Puget Sound Natural Spring	Nooksack Spring Skagit Spring	NKS NKS	FRAM based FP in 2 new ccc file (NKS, SKS)
Upper Strait of Georgia	Klinaklini Kakweikan Wakeman Kingcome Nimpkish	GSQ	Model generated ccc file
Fraser Early (springs and summers)	Upper Fraser Mid Fraser Thompson	FRE	Model generated ccc file
West Coast Vancouver Island Falls	Artlish Burman Gold Kauok Tahsis Tashish Marble	RBT	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file
Puget Sound Natural Summer/Falls	Skagit Stillaguamish Snohomish Lake WA Green River	SKG STL SNO PSN PSN	FRAM based FP in 3 new ccc file (PS_falls, LkWA, GRN). PS_falls = SKG, STL, SNO.
North/Central BC	Yakoun Nass Skeena Area 8	NTH	Model generated ccc file
Washington Coastal Fall Naturals	Hoko Grays Harbor Queets Hoh Quillayute	WCN	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file
Col River Falls	Upriver Br Deschutes Lewis	URB URB LRW	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file
Columbia River Summers	Mid-Col Summers	SUM	Model generated ccc file
Far North Migrating Oregon Coastal Falls	Nehalem Siletz Siuslaw	SRH	External HR in spreadsheet (termER_yyyy.xls) With model generated ccc file

## 4 STOCK SPECIFIC DATA AND ALGORITHMS USED PRESEASON

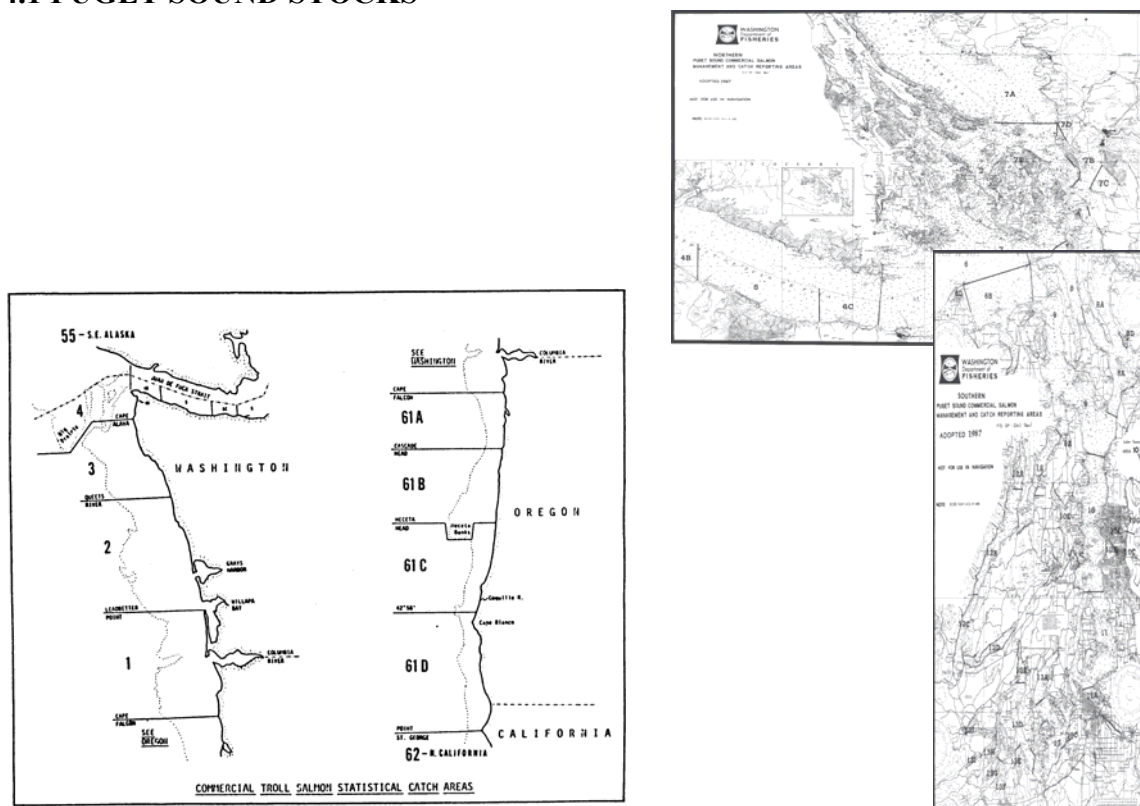


**Figure 8: US ISBM stocks and locations**

There are 19 US stocks (Skagit has both a summer/fall and spring/summer run, Figure 8) that are of concern to the US for which an ISBM index is computed. The methods and techniques to compute these

indices are not entirely transparent however, and various assumptions are made to compute the index. The next section highlights the assumptions for each of these stocks for computing a pre-season index.

## 4.1 PUGET SOUND STOCKS



**Figure 9: Detailed maps showing fisheries management areas in Puget Sound and the Washington coast**

Most Puget Sound stocks are encountered in the Washington troll, northern Puget Sound net and sport fisheries as well as terminal areas fisheries (Figure 9 above). In the following section, we show the calculations of each stock of Puget Sound of interest to the CTC, and the base period harvest rates and assumption used in deriving these indices for each stock.

### 4.1.1 Nooksack Spring

The Nooksack Spring stock is the northern most located stock in Puget Sound (Figure 8). Preseason FP's for NKS stock is based on harvest rates from Chinook FRAM (MEW 2003) model. There are 7 fisheries in the Chinook FRAM (MEW 2003) model which have base period exploitation rates (BPER) which are required to calculate the FP. See Appendix 1 for step by step instructions on how to calculate preseason FP's for Puget Sound stocks derived from Chinook FRAM outputs (MEW 2003). The 7 fisheries used to compute the FP are shown below (Table 5):

**Table 5: FRAM fisheries and relationship to CTC model fisheries for Nooksack Springs**

ISBM Fishery Group	FRAM modeled fishery with BPER
Washington/Oregon/California Ocean Troll	T Area 3:4:4B Troll
Puget Sound Northern Net	NT Area 6A:7:7A Net T Area 6A:7:7A Net

Puget Sound Northern Sport	NT Area 5-6 Sport NT Area 7 Sport NT Area 9 Sport
Freshwater Terminal Net	Freshwater Net

After generating the FP's from the FRAM model (MEW 2003), stock specific FP scalars are entered into the PSC model for the Nooksack Spring stock (NKS) before generating a new production run. In addition, the ceiling file is modified with the expected catches from the different ocean fisheries in the US and Canada. A model projection run is then made and various outputs are created. These output files (namely the \*.ccc) is then used to compute the ISBM index for this stock. See Table 1.1a - 1.1b in Appendix 1 to see the various components of this index (namely the stock harvest rates over time from the FRAM (MEW 2003), the FP's and catches in both legal and sub-legal components of the various southern US and Canadian ISBM fisheries, respectively).

For the Canadian component of the index, we use model base period exploitation rates in the Canadian ISBM fisheries and relate these to current Exploitation catch to get a new ISBM index. This is shown in Appendix 1 Table 1.1 (c) and 1.1 (d).

#### 4.1.2 Skagit Spring

Skagit is the second most northern located stock in Puget Sound (Figure 8). Preseason FP's for Skagit Spring stock is based on harvest rates from Chinook FRAM model for the SKS (Skagit Spring) stock. This is a case when a different base period (namely NKS is used along with Skagit spring current year data when we run the model). There are 7 fisheries in the Chinook FRAM model which have base period exploitation rates (BPER) which are required to calculate the FP. See Appendix 1 for step by step instructions on how to calculate preseason FP's for Puget Sound stocks derived from Chinook FRAM outputs. The 7 fisheries used to compute the FP are exactly the same as the ones used for Nooksack above (Table 5).

After generating the FP's from the FRAM model, stock specific FP scalars are entered into the PSC model for the Nooksack Spring stock (this is done as there is no model stock for Skagit Spring) before computing a production run. Thus, an implicit assumption that other than the 4 CTC model (7 FRAM) fisheries for which stock specific FP's are computed, Nooksack Spring and Skagit Spring stocks undergo the same exploitation rates in other fisheries.

In addition, a new ceiling file is generated with the expected catches from the different ocean fisheries in the US and Canada. A model projection run is then made and various outputs are created. These output files (namely the \*.ccc) is then used to compute the ISBM index for this stock. See Table 1.2a -1.2d in Appendix 1 to see the various components of the US and Canadian portions of this Index (namely the stock harvest rates from the FRAM, the FP's and catches in both legal and sub-legal components of the various southern US and Canadian ISBM fisheries, respectively).

#### 4.1.3 Skagit Fall

The Skagit fall stock has a different run timing than the Skagit spring stocks (Figure 8). They both spawn in the same river however, at different locations. Similar procedures are used for the Skagit fall stocks as in the Spring stocks using the Chinook model stock for Skagit (stock specific FP's are created, a stock specific production run is made, with a new \*.ccc file which is then used for computing the index). The same five fisheries are modified, namely North Puget Sound Net, North Puget Sound Sport, South Puget Sound Net, South Puget Sound Sport, and Washington Troll. An additional two fisheries are Washington

Ocean Sport (WCS) and Washington Coast Net (WCN). See Tables 1.3 a-d in Appendix 1 to see the various components of this Index (namely the stock harvest rates from the FRAM, the FP's and catches in both legal and sub-legal components of the various southern US and Canadian ISBM fisheries).

#### **4.1.4 Stillaguamish Fall**

Stillaguamish River is located a little north of Seattle (Figure 8). For this stock, sport recoveries are unavailable for the base period, so only net recoveries are used. The only fisheries modified are North Puget Sound Net, South Puget Sound Net, Washington Troll and Washington Coast Net. The model stock used here is the Stillaguamish. The same algorithm as shown in figure 6 above is used. See Table 1.4 a-d in Appendix 1 to see the various components of the US and Canadian Index (namely the stock harvest rates from the FRAM, the FP's and catches in both legal and sub-legal components of the various southern US and Canadian ISBM fisheries).

#### **4.1.5 Snohomish Fall**

Snohomish River is located a little north of Seattle, near Everett (Figure 8). Similar to the Stillaguamish stock, the Washington sport recoveries are missing for this stock in the base period. The model stock used here is the Snohomish. We thus use only the NPSN, SPSN, WATRT and WCN for this stock. The same algorithm as shown in figure 3 above is used. See Table 1.5 a-d in Appendix 1 to see the various components of the US and Canadian Index.

#### **4.1.6 Lake Washington Fall**

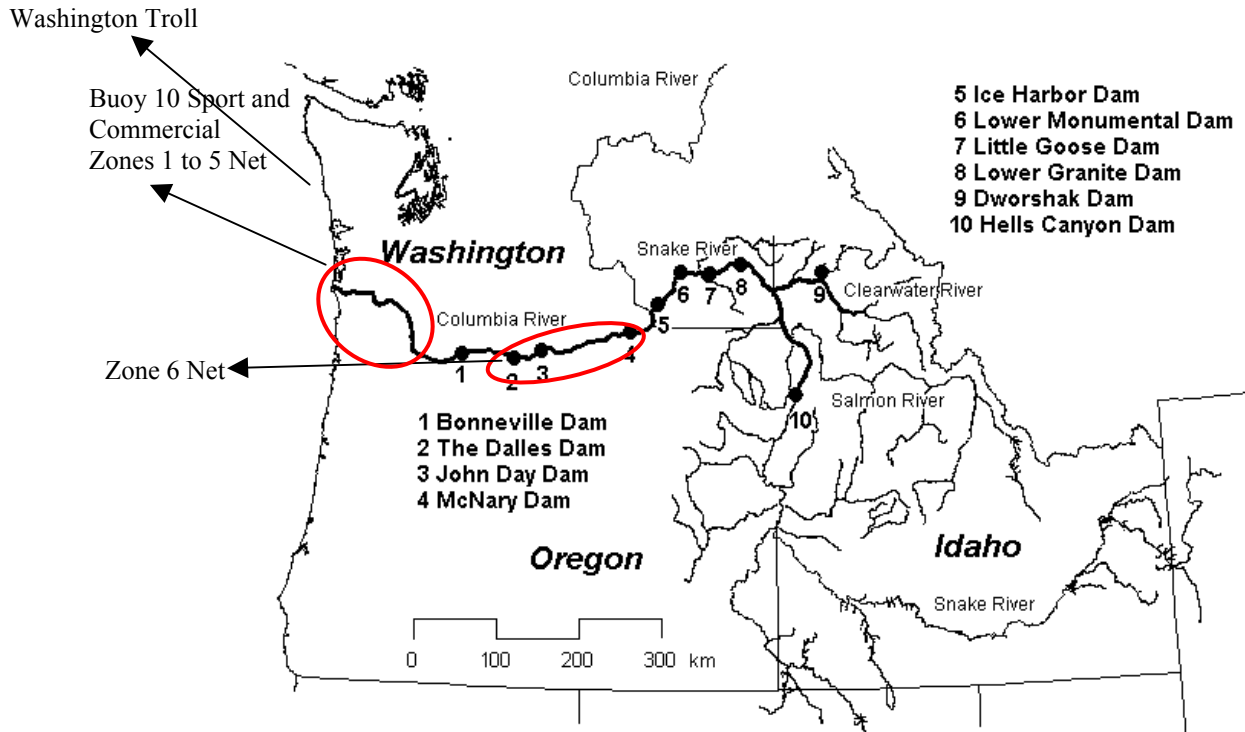
The Lake Washington stock is located in lake Washington and the Cedar River drainage (Figure 8) near Seattle and Bellevue. For this stock, similar to the Skagit Falls, the following fishery harvest rates are computed through external Fp's. Since there is no unique Lake Washington stock here, we use the Puget Sound Natural stock to model these effects pre-season for the Lake Washington stock. The fishery specific harvest rates obtained for this stock are North Puget Sound Net, North Puget Sound Sport, South Puget Sound Net, South Puget Sound Sport, Washington Troll, Washington Coast Net, and Washington Coast Sport. The Puget Sound algorithm (Figure 6) is used, and the data is available in Table 1.6 (a-d) in Appendix 1.

#### **4.1.7 Green River Fall**

This river is located south of Seattle and near Tacoma (Figure 8). Similar to the Lake Washington Fall stock, the Green River stock has external FP's generated for North Puget Sound Net, North Puget Sound Sport, South Puget Sound Net, Washington Troll, Washington Coast Net, and Washington Coast Sport from FRAM outputs (step 3 in Appendix 1 Table 1.7 a). As with the Lake Washington stock, the Puget Sound Natural's base harvest rates with Green current year cohort size are used to calculate the ISBM index. The Puget Sound algorithm is used for this stock (Figure 6). The step by step calculation of the 2003 ISBM index for this stock can be found in Table 1.7 a-b in Appendix 1. The base period catch, shaker mortalities, and cohort for this stock are shown in Table 1.7 b. For the Canadian components of this index similar material is available in Tables 1.7(c-d).

### **4.2 COLUMBIA RIVER STOCKS**





**Figure 10: Detailed map of the major fisheries involved for the Columbia River stocks**

The Columbia River has numerous stocks that are important for PSC purposes (URB's, SUM's, Deschutes and Lewis River Wild, Figure 8). Most of these stocks are in the model, other than the Deschutes. For the Deschutes, stock specific FP's need to be created. As shown above, the vast majority of encounters are in the Washington Troll and inriver net and sport fisheries for the US index (Figure 10). However, some catch is also observed in Juan de Fuca and Puget Sound fisheries and in some fisheries in Canada (for the Canadian index).

#### 4.2.1 Lewis River Wild

The Lewis River is located on the Washington side of the Columbia River and is in the Lower Columbia (Figure 8). The Columbia River FP is an average of the last 3 years exploitation on this stock in both the lower river net and sport fisheries, as well as in the ocean troll. This is what is used in a production run to compute a \*.ccc file, that is then manipulated by the ISBM program. Lower River wild is the stock group from the model which is used in computing an index for the Lewis River. The various component of the index are shown in Appendix 2, Table 2.1 (a-d).

#### 4.2.2 Upriver Brights

Upriver Brights are one of the largest existing natural runs on the Columbia. They occur mainly downstream of Priest Rapids dam (Figure 10, and Figure 8). Similar to the Lewis River wild stock specific FP's are computed for the in-river net and sport fisheries, as well as in the ocean troll. The

production run \*.ccc is then used to generate the ISBM index. The various components of the index are shown in Appendix 2, Table 2.2 (a-d).

#### **4.2.3 Deschutes River Fall**

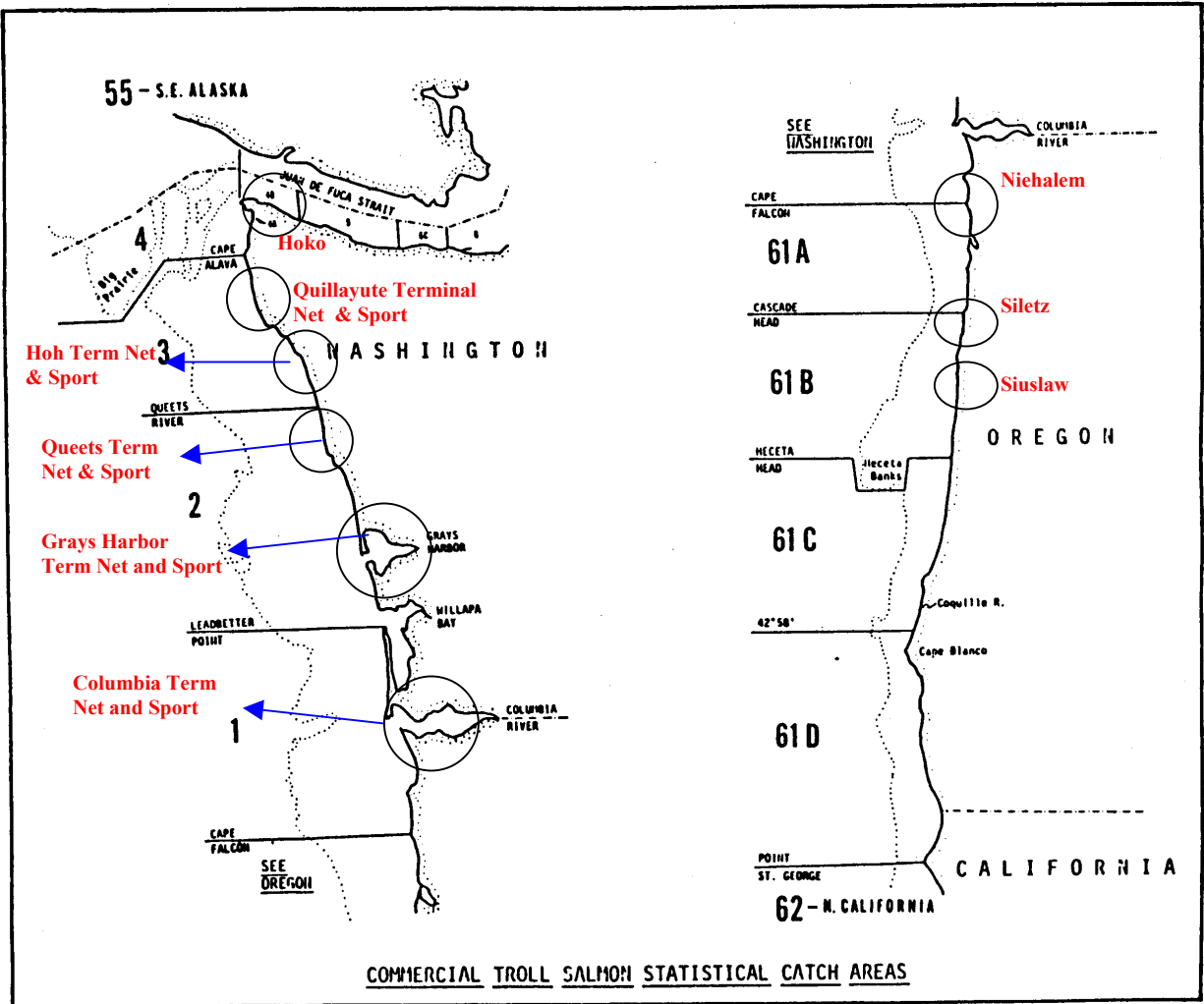
The Deschutes River is a component of the Bright population on the Columbia River. The mouth of the Deschutes River is located between the Dalles and John Day dams (Figure 8 and Figure 10). There is no Deschutes model stock so we use the Upriver Bright stock to model the ISBM index on the Deschutes. Since the Deschutes stock is a component of the Upriver Bright stock aggregate, the in-river harvest rates and impacts have to be partitioned out for the various lower river sport and commercial fisheries.

Table 2.3 (a-d) Appendix 2 has the adjusted harvest rates based on the Deschutes in river exploitation rate (this is based on observed escapement and terminal run to the Deschutes as well as the Columbia main-stem harvest). These external exploitation rates computed (figure 7) are then used in conjunction with the URB stock of the model to compute an ISBM Index.

#### **4.2.4 Columbia Upriver Summers**

The Columbia River summers are located the furthest upstream from the river mouth (Figure 8). The Chinook model stock used is the Upriver Summers. Similar to the Lewis River wild stock specific  $F_p$ 's are computed for the in-river net and sport fisheries, as well as in the ocean troll. The production run \*.ccc is then used to generate the ISBM index. The various components of the index are shown in Appendix 2, Table 2.4.(a-d).

### **4.3 WASHINGTON COAST AND OREGON COAST STOCKS**



**Figure 11: Map of US ISBM Fisheries on the coastal troll coastal sport, and in coastal terminal areas**

There are five stocks along the Washington coast and three on the Oregon coast (Figure 8 and Figure 11). These stocks are mostly impacted by terminal area fisheries which are either terminal net and/or sport. In addition, the ocean troll and sport fishery catch these stocks in fairly high numbers. In addition as these stocks are all far-north migrating, they are encountered in numerous Canadian and Alaskan fisheries. It should be noted that all five rivers from the WA coast have the same Canadian index, but different US indices as they have different terminal harvest rates.

The implicit assumption for the Washington coast stocks is that they use Washington coast naturals as an indicator, which is an aggregate of all five Washington coast natural stocks. However, they match this with the Quinault indicator tag group and so there isn't complete representation of Washington coast naturals in this stock group. For the Oregon coast stocks a stock aggregate on Northern Oregon coast Chinook stocks is used. This is aggregated with Salmon River hatchery indicator which is located on the Oregon coast north of the Siletz River.

#### 4.3.1 Hoko River

The Hoko River lies on the Northwestern tip of the Olympic peninsula and drains into the Strait of Juan de Fuca (Figure 8 above). External harvest rates are used for this stock. Since both the terminal area fisheries are closed, these are all zeroed out. The fisheries modified are either the Washington coast net,

or the terminal net and sport. Data for the harvest rates and catches are determined externally from the Makah tribe. The Hoko uses Washington coast naturals as the model stock and replaces the harvest rates in the terminal net fisheries with what was observed. Thus it uses the external harvest rate method (Figure 7). Once these are obtained, stock specific harvest rates relative to the base are computed for the above named fisheries, the \*.ccc file is overwritten by the harvest rates observed for these fisheries and the ISBM index is computed using the flow shown in Figure 7 (Appendix 3 Table 3.1a-d). For the Canadian index we just use the Washington coast naturals to estimate this index.

#### **4.3.2 Grays Harbor**

Grays harbor has two main rivers namely the Chehalis and the Humptulips which drain into it (Figure 8). The Chehalis has many distinct tributaries which all support Chinook, namely the Satsop, Skookumchuck, Wynochee, Hoquiam and the Newaukum rivers. The Chehalis is the second largest drainage area after the Columbia in Washington state. Washington coast naturals is the model stock used in computing this index for Grays Harbor. Similar to the Hoko, external FP's are created from data obtained from the B Tables in the Pacific Fisheries Management Council (Table B 20, PFMC 2003) ocean review document. Once these are obtained, stock specific harvest rates relative to the base period are computed for the above named fisheries, the \*.ccc file is overwritten by the harvest rates observed for these fisheries and the ISBM index is computed using the flow shown in Figure 7 (Appendix 3 Table 3.2a-d). For the Canadian index we just use the Washington coast naturals to estimate this index.

#### **4.3.3 Queets River**

The Queets River drains in the middle of the Olympic peninsula (Figure 8) into the Pacific ocean. Most of this river lies in Olympic National Park, though a major tributary, the Clearwater lies in Department of Natural Resources land. Washington coast naturals is the model stock used in estimating the index for the Queets using the model. Similar to the previous 2 rivers, external harvest rates are created for the Queets relative to the base (Table B 30, PFMC 2003). Once these are obtained, stock specific harvest rates relative to the base period are computed for the above named fisheries, the \*.ccc file is overwritten by the harvest rates observed for these fisheries and the ISBM index is computed using the flow shown in Figure 7 (Appendix 3 Table 3.3a-d). For the Canadian index we just use the Washington coast naturals to estimate this index.

#### **4.3.4 Hoh River**

The Hoh river also drains directly into the Pacific and lies north of the Queets River (Figure 8). A large portion of this river is also in Olympic National Park. As in the above cases Washington Coast Naturals is the model stock used for the Hoh in computing this index. External harvest rates are created for the Hoh relative to the base (Table B 33, PFMC 2003). Once these are obtained, stock specific harvest rates relative to the base period are computed for the above named fisheries, the \*.ccc file is overwritten by the harvest rates observed for these fisheries and the ISBM index is computed using the flow shown in Figure 7 (Appendix 3 Table 3.4a-d). For the Canadian index we just use the Washington coast naturals to estimate this index.

#### **4.3.5 Quillayute River**

The Quillayute also drains directly into the Pacific and is located north of the Hoh on the Olympic peninsula. Washington coast Naturals is the model stock used in computing this index for the Quillayute. External harvest rates are created for the Quillayute relative to the base (Table B 36, PFMC 2003). Once these are obtained, stock specific harvest rates relative to the base period are computed for the above named fisheries, the \*.ccc file is overwritten by the harvest rates observed for these fisheries and the

ISBM index is computed using the flow shown in Figure 7 (Appendix 3 Table 3.5a-d). For the Canadian index we just use the Washington coast naturals to estimate this index.

#### **4.3.6 Nehalem River**

This river lies south of the Columbia River and is north of Tillamook on the Oregon coast. It drains directly into the Pacific (Figure 8). This stock uses the Oregon coast natural model stock in computing the index. In river harvest rates are determined for coastal stocks from external run reconstructions (Curt Melcher, ODFW personal communications). These harvest rates overwrite the Terminal area fishery (sport) rates in the \*.ccc file to generate new catch estimates which are then used to compute the ISBM Index (Appendix 3 Table 3.6 a-d).

#### **4.3.7 Siletz River**

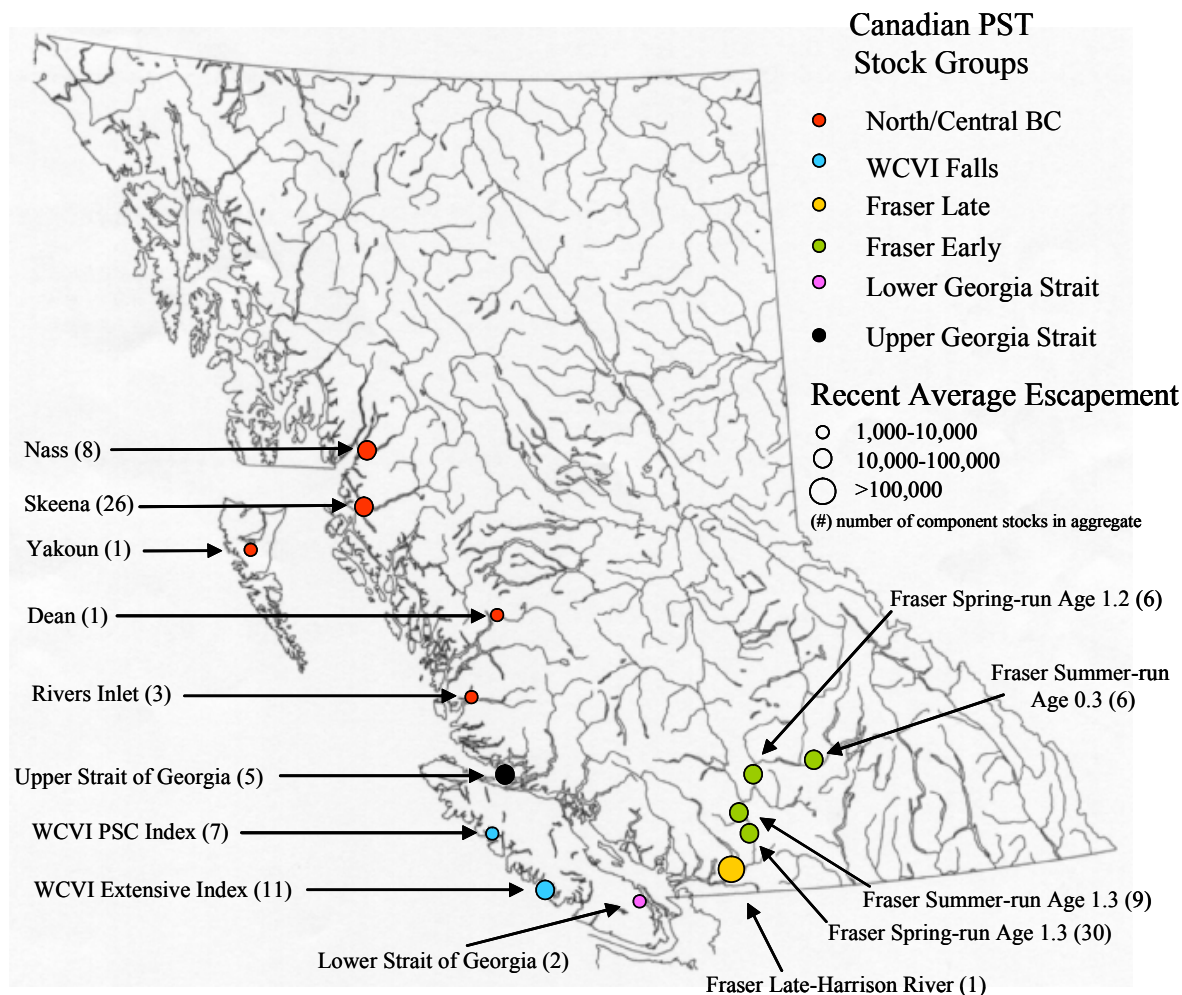
This is also on the Northern Oregon coast and drains directly into the Pacific near Lincoln city (Figure 8). This stock uses the Oregon coast natural model stock in computing the index. In river harvest rates are determined for coastal stocks from external run reconstructions (Curt Melcher, ODFW personal communications). These harvest rates overwrite the Terminal area fishery (sport) rates in the \*.ccc file to generate new catch estimates which are then used to compute the ISBM Index (Appendix 3 Table 3.7 a-d).

#### **4.3.8 Siuslaw River**

This is also on the Northern to mid Oregon coast and drains directly into the Pacific near Florence (Figure 8). This stock uses the Oregon coast natural model stock in computing the index. In river harvest rates are determined for coastal stocks from external run reconstructions (Curt Melcher, ODFW personal communications). These harvest rates overwrite the Terminal area fishery (sport) rates in the \*.ccc file to generate new catch estimates which are then used to compute the ISBM Index (Appendix 3 Table 3.8 a-d).

### **4.4 CANADIAN STOCKS**

The Canadian stocks cover areas from Lower Georgia Straits, Upper Georgia Straits, the Fraser River (both early and late), West Coast of Vancouver Island Falls and North Central British Columbia (Figure 12 below). The stock aggregates modeled preseason are quite extensive in area. The only stocks of finer resolution are Lower Georgia Straits (Cowichan and Nanaimo) and Fraser lates (Harrison River).



**Figure 12: Detailed map of the stocks involved for the Lower and Upper Georgia Strait, Vancouver Island and North Central British Columbia**

#### 4.4.1 Lower Strait of Georgia (Cowichan, Nanaimo)

Lower Georgia Straits stocks are located on the south-east side of Vancouver Island in between Victoria and Nanaimo (Figure 12). The model stock used in projection of these indices is the Lower Georgia Strait complex. In years prior to 2005, stock specific harvest rates relative to the base were used in conjunction with the model (the external harvest rate method, figure 7). In 2005, CDFO staff realized inconsistencies with the method and decided to use a single index for the Lower Georgia Strait complex. The base and current data (2003 calibration 0308) along with the computation flow are shown in Appendix 4, Table 4.1 (a-d) for the US and Canadian index respectively.

#### 4.4.2 Upper Strait of Georgia (Klinaklini, Kakweikan, Wakeman, Kingcome, Nimpkish)

Upper Georgia Strait complex includes stocks on the upper east coast of Vancouver island and mainland British Columbia (figure 12). The model stock used for this complex is the Upper Georgia strait complex. This stock complex represents five different areas and it is assumed that there are no differential harvest rates in any of these fisheries in these areas. The Upper Georgia Strait fishery has been reduced dramatically since the base period and as such this index has been shown to be quite low in recent years.

In addition these stocks are not encountered in US fisheries and we thus compute an index only for the Canadian stocks. The base and current data (2003 calibration 0308) along with the computation flow are shown in Appendix 4, Table 4.2 (c-d) for the Canadian index only.

#### **4.4.3 Fraser Late (Harrison)**

The Fraser late's (FRL) are the only stock group in Canada that is uniquely represented in the model. The lower Fraser river is located near Vancouver and drains into the Strait of Georgia (Figure 12) on mainland British Columbia. This is one of the largest single stock groupings and is also a very strong run that contributes in large numbers to both the WCVI abundance index as well as the SEAK abundance index. The model stock used in this analysis is Fraser Lates. The base and current data (2003 calibration 0308) along with the computation flow are shown in Appendix 4, Table 4.3 (a-d) for the US and Canadian index respectively.

#### **4.4.4 Fraser Early (Upper Fraser, mid-Fraser, Thompson)**

This stock complex encompasses a very large area (Figure 12). The Upper Fraser, mid-Fraser and Thompson encompass a total of 51 sub-stock units (Figure 12) and thus coverage and assumptions are applied to all 51 stocks using the model and base period data. The model stock complex used is Fraser Early's. These stocks are only encountered in US and Canadian fisheries and the flow and data used in the 2003 calibration is shown in Appendix 4 Table 4.4 a-d.

#### **4.4.5 West Coast of Vancouver Island Falls (Artlish, Burman, Gold, Kauok, Tahsis, Tashish, Marble)**

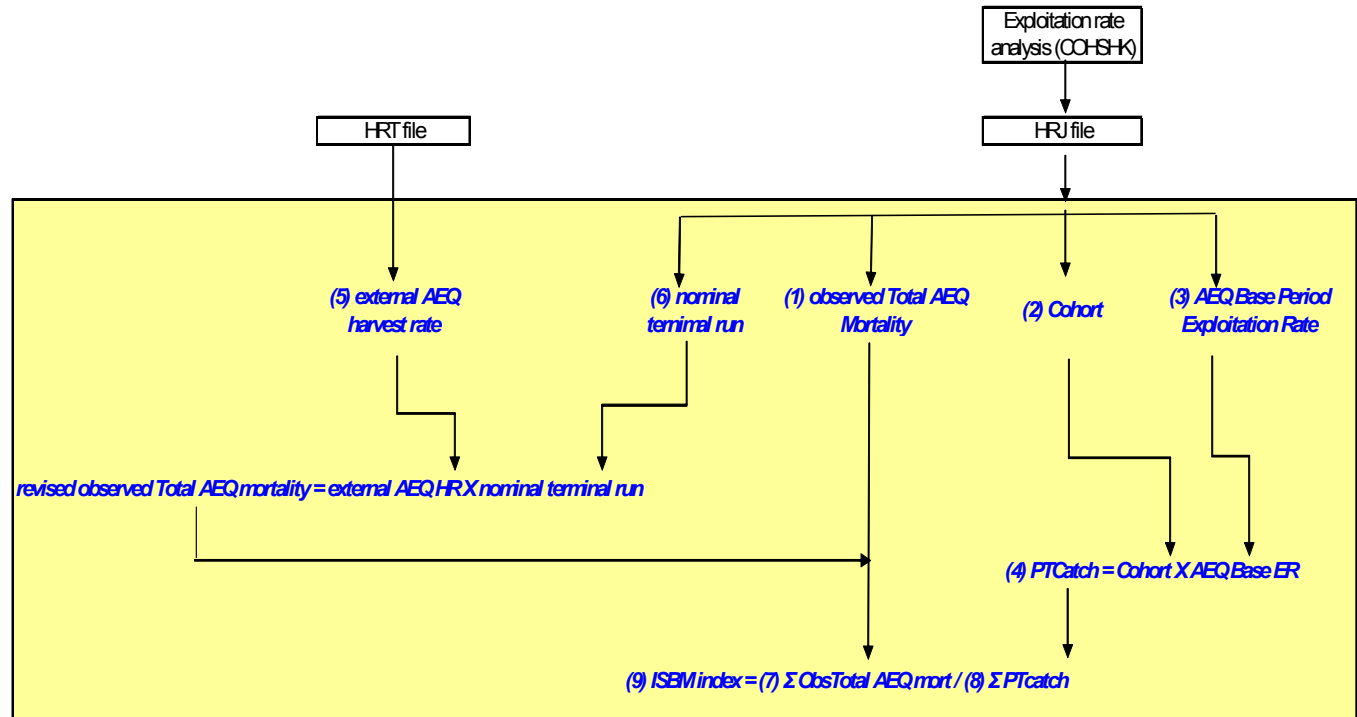
WCVI Naturals is an aggregate complex of 7 stocks that flow directly into the Pacific (Figure 12). The model stock used in this is Robertson Creek hatchery as well as the WCVI naturals (both hatchery and natural components together). West Coast Vancouver island fisheries are structured to avoid impacts on these natural stocks of concern and target the hatchery component in Barkley Sound between Ucluelet and Bamfield on the west coast of Vancouver island. The index is shown computed for these terminal areas using external harvest rates for the 2003 fisheries (but was later flagged in 2005 by CDFO staff as being inconsistent as the harvest rates on terminal areas is primarily non-existent on the natural groups). The data and flow to compute these indices are what was done in 2003 however, and as such those rates are included in the tables (Appendix 4 Tables 4.5 a-d).

#### **4.4.6 North/Central BC (Yakoun, Nass, Skeena, Area 8)**

The stock complex modeled here is extremely large (35 different sub-stocks groups in the Yakoun, Nass and Skeena with 34 in the latter two, Figure 12). Including Dean and Rivers inlet we have another 4 stock-groups. The area of coastline encompassed is here is over a 1000 miles and hence coverage is severely limited in this area. The model stock used is North Central BC (NTH). These stocks are primarily caught in Canadian fisheries and hence and index is only generated for Canada (Appendix 4 Table 4.6 c-d).

## 5 POST SEASON COMPUTATION OF THE ISBM INDICES

### Post season ISBM index with and without external harvest rates.



footnote 3: if term fishery, then cohort = term run  
 if preterm net fishery, then cohort = term run + total mort(age 4)  
 if preterm troll fishery, then cohort = ocean cohort

footnote 5: Terminal Flag for fishery 15 (terminal net) and 25 (terminal sport) = 1 for all stocks (overwrite the values found in the BSE file)

footnote 6: if Terminal Flag = 1 or Ocean Net Flag = 1 and age >= 4, then AEQ = 1

**Figure 13: Computation flow for Post-Season ISBM indices**

The ISBM index is evaluated using the pass-through index computed directly from observed CWT data. However, since not all stocks are associated with an indicator tag program, certain sets of CWT groups are used to estimate impacts in certain mixed stock fisheries in the respective areas (e.g. Georgia Straits in Canadian fisheries and Washington & Oregon coastal stocks in US fisheries) while terminal area harvest rates replace those from those CWT tag rates to compute a pseudo index (figure 13) by overwriting the observed exploitation rates in those areas with the actual harvest rate observed in the terminal run in that area.

There may be some indirect problems with this approach as one is only representing a hatchery tag group while the terminal area harvest rate is observed on both hatchery and natural components in some cases. Nonetheless the implicit assumption is that a hatchery tag code represents a certain natural stock for all our basic model assumptions, and would thus have the same inherent exploitation rate.

In general two different approaches are used, one which relies directly on the CWT data and the other that relies on CWT data in conjunction with terminal harvest rates. Tables 4 and 5 (below) summarize the



stocks which rely on these methods. The basic CWT data as well as the current catch can be seen computed for the 2003 calendar year (the 2005 Exploitation Rate Analysis is two years out and will correspond to Calib0308 for post-season performance) and stocks in Appendices 5 through 9. Areas that are not covered or large stock aggregates using one index are also summarized in Tables 6 and 7 with the appropriate Appendix identified to follow the flow and structure in computing the index using figure 13.

**Table 6: Stocks and coverage for indices in particular jurisdiction (US or Canada) using CWT data**

<b>Stock Group</b>	<b>ISBM Stock</b>	<b>CWT Stock</b>	<b>Methods</b>
Washington Coastal Fall Naturals	Hoko Queets	Hoko* Queets	CWT (Appendix 7) Table 7.2
Col River Falls	Upriver Brights Lewis	Upriver Bright Lewis River Wild	CWT (Appendix 6) Tables 6.1 and 6.2
Columbia River Summers	Mid-Columbia Summers	Columbia Summers	CWT (Appendix 6) Table 6.4

\* no data was available for 2003 ERA.

**Table 7: Stocks and coverage for indices in particular jurisdiction (US or Canada) using CWT data in conjunction with terminal harvest rates**

<b>Stock Group</b>	<b>ISBM Stock</b>	<b>CWT Stock</b>	<b>Methods</b>
Upper Strait of Georgia	Klinaklini Kakweikan Wakeman Kingcome Nimpkish	Quinsam	CWT with terminal fishery HR in HRT file (Appendix 8) Table 8.2
West Coast Vancouver Island Falls	Artlish Burman Gold Tahsis Tashish Marble Kauok	Robertson Creek	CWT with terminal fishery HR in HRT file (Appendix 8) Table 8.4
Puget Sound Natural Summer/Falls	Green River	South PS Fall Fingerlings	CWT with terminal fishery HR in HRT file (Appendix 5) Tables 5.1a-b
Washington Coastal Fall Naturals	Grays Harbor Hoh Quillayute	Queets Queets Queets	CWT with terminal fishery HR in HRT file (Appendix 7). Tables 7.1, 7.3 & 7.4
Col River Falls	Deschutes	Upriver Bright	CWT with terminal fishery HR in HRT file (Appendix 6). Table 6.3
Far North Migrating Oregon Coastal Falls	Nehalem Siletz Siuslaw	Salmon River Hatchery Salmon River Hatchery Salmon River Hatchery	CWT with terminal fishery HR in HRT file (Appendix 7) Tables 7.5, 7.6 & 7.7

As is evident from the above tables very few stocks have adequate coverage to use in all fisheries. Table 7 makes it abundantly clear that harvest rates of certain fisheries have to be estimated external to the tag codes based on direct terminal run reconstructions. In addition Fraser Late's and most Puget Sound stocks have inadequate coverage in the base period, and hence data from other tag codes and areas from the base have to be used in conjunction with those. These stocks are covered in Table 8 below.

**Table 8: Coded Wire Tag without adequate base period coverage.**

<b>Stock Group</b>	<b>ISBM Stock</b>	<b>CWT Stock</b>	<b>Methods</b>
Lower Strait of Georgia	Cowichan Nanaimo	Cowichan Big Qualicum River	CWT with terminal fishery HR in HRT file, base period HR from STK file (Appendix 8). Table 8.1(a-b)
Fraser Late	Harrison	Chilliwac	CWT with terminal fishery HR in HRT file, base period HR from STK file (Appendix 8) Table 8.3(a-b)
North Puget Sound Natural Spring	Nooksack Spring* Skagit Spring*	Nooksack Spring N/A	CWT, base period HR from STK file (use NKS)
Puget Sound Natural Summer/Falls	Skagit* Stillaguamish* Snohomish*	N/A Stillaguamish Fall Fing N/A	CWT, base period HR from STK file, SKG base period HR from STK file (use NKS), STL base period HR from STK file

\* Due to problems in the tag assessment programs these indices were not computed for 2003 ERA.

Most Puget Sound stocks thus have inadequate coverage in the base years and assumptions need to be drawn from different stocks or tag codes that were represented adequately in the base and have some exploitation rates available for them.

In addition the programs that are used to compute these indices are often problematic, and not easy to decipher. An easy user's guide as to the appropriate choices to make and how to compute these indices either directly from the output generated from the exploitation rate analysis or some manipulation of it is made available to the users of this index for either the data directly from the exploitation rate analysis (Appendix 9), or some modification of the exploitation rate data in conjunction with either data for some fisheries from current years or data on the base periods for other stocks (Appendix 10).

## 6 CURRENT LIMITATIONS ON THE ISBM INDEX

### 6.1 LOGISTICAL PROBLEMS ON DATA REPORTING

The calculation of pre-season model-based indices are followed by a post-season evaluation using coded wire tags (CWTs) two years later. Tagged data takes a while to process and input into the Regional Mark Information System (RMIS), a centralized data base,. As such, for 2 years after the fisheries have occurred, we have no means of assessing whether we met the target ISBM index objectives for a certain stock, though managers will report on whether agreed escapement objectives have been met for that stock or stock aggregate. In the case when the stock achieves its escapement goal, this is a moot point. However, if a stock doesn't meet its escapement objectives, concerns have been made about whether the intent of ISBM provisions of the Chinook chapter is being fulfilled by the managers.

There may be possible alternatives that can be used to measure ISBM compliance where escapement goals are not being met if we change the way we produce post-season assessments. If we use the model to assess post-season performance with the AI's (we don't use the CWT data to assess ISBM compliance if we met our objective or not in the ocean fishery), we may have a potential alternative to address this management concern. We would need to project FP's or ceiling catches for all the associated fisheries and then compute an ISBM index from the model but this time with observed rather than projected harvest rates (that we do preseason) on the stocks of concern.

### 6.2 POST-SEASON PERFORMANCE (CWT VERSUS MODEL)

An analysis was performed on pre and post season estimates of ISBM indices. Two measures of performance were examined. When both pre and post season data (between 1999 and 2003) were available, correlations to define how the indices tracked one another were computed. For the other measure, bias between the projected ISBM index using the Chinook model and what happened using the CWTs was assessed.

#### 6.2.1 US ISBM FISHERIES

##### 6.2.1.1 Puget Sound

There is only 3 years of CWT data for the Stillaguamish and Nooksack Springs. While the Stillaguamish post-season ISBM index tracks the pre-season index trend well, it seems to be underestimating the impacts using the model. In this region, there is no information available to evaluate the Skagit, Snohomish, Lake Washington and Skagit Spring Chinook stocks as there is no CWT data to represent what happened to these stocks post season (Figure 14). The only stock with adequate coverage here is Green River as even the Stillaguamish fall and Nooksack springs tagging programs were stopped in the early 2000s, due to funding cuts.

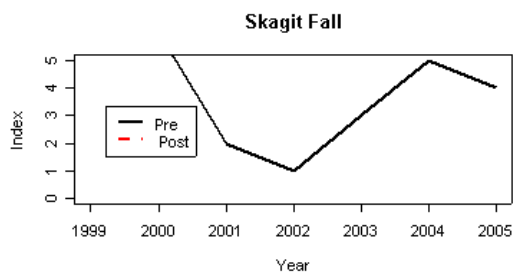
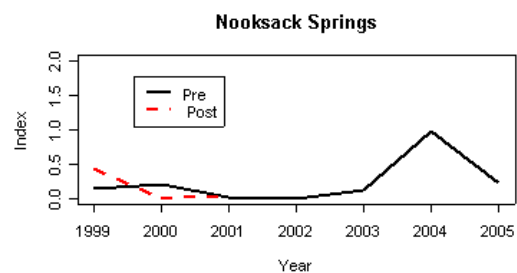
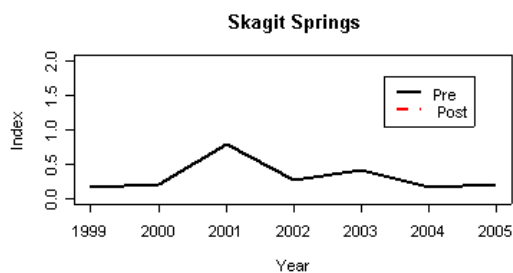
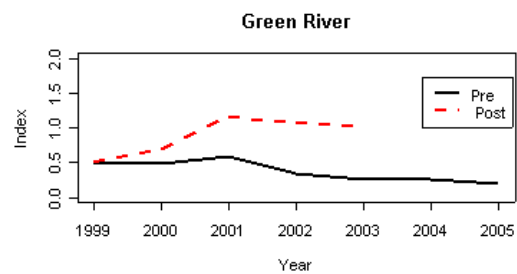
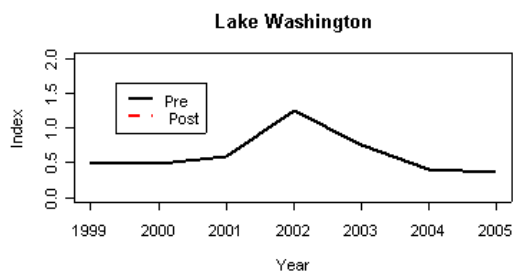
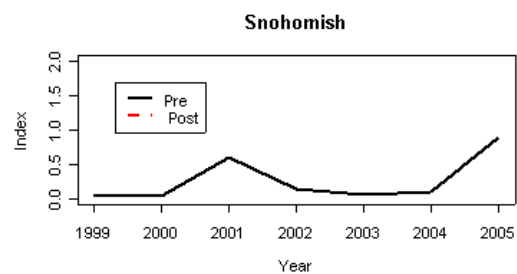
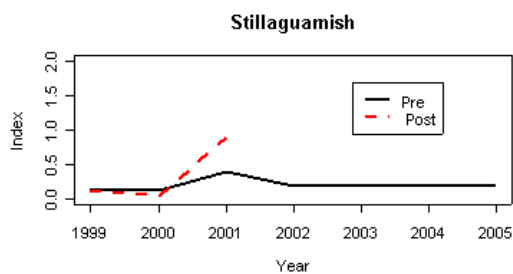
A possible solution is to take the Green River CWT data and then adjust the recoveries with stocks from the base period (creating a new base) and then calculating an index based on that new base. However this has major assumptions associated with the tag code and may not be entirely appropriate.

**Table 9: Correlation of pre and post season for Puget Sound stocks (Fall and Spring)**

<b>Stock</b>	<b>Correlation Coefficient (<math>\rho</math>)</b>	<b>Avg Bias ((Post-Pre)/Post)</b>
Skagit F	NA	NA

Stillaguamish	0.9963*	-71%
Snohomish	NA	NA
Lake Washington	NA	NA
Green River	-0.169	44%
Skagit Springs	NA	NA
Nooksak Springs	0.1836*	70%

\* based on 3 years data



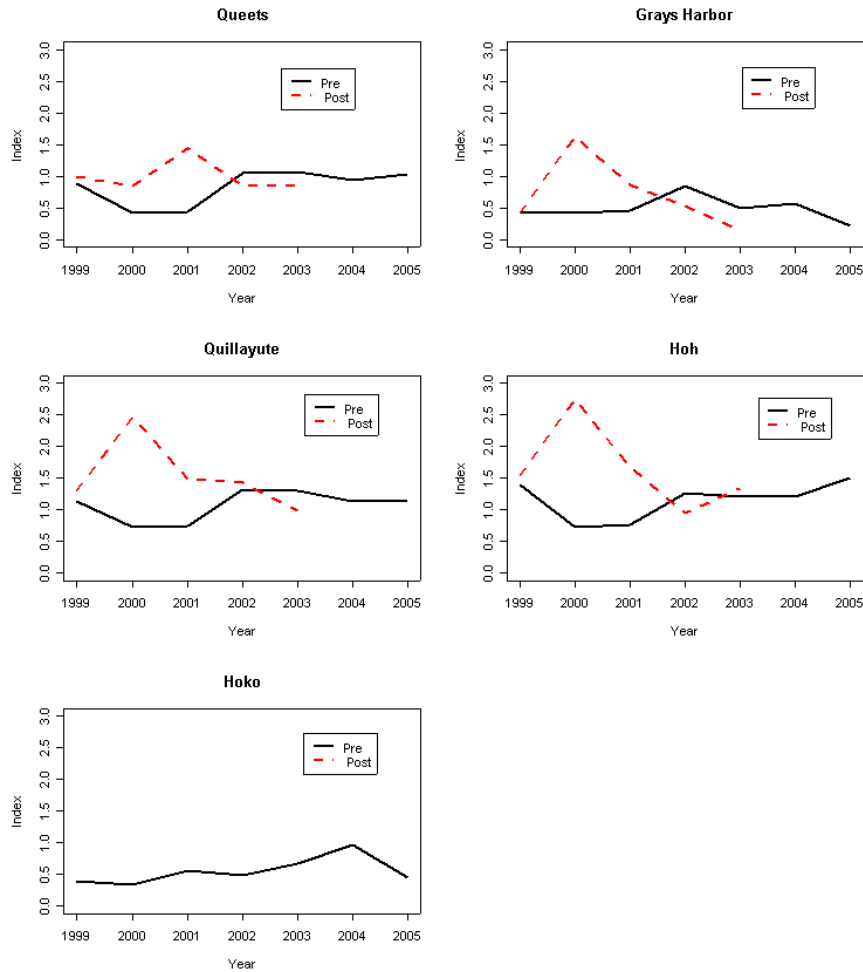
#### **Figure 14: Puget Sound pre and post season performance**

##### **6.2.1.2 Washington Coast**

Pre and post season bias is lower for the Washington Coastal stock aggregate compared to Puget Sound for this stock complex. However, this may be an artifact of the assumption that the base period tag that maps all the Washington coast stocks is the Queets indicator stock. This may not be entirely accurate and system specific tag codes would be more appropriate. In addition, for stocks such as Grays Harbor, Hoh and Quillayute adjustments are made to terminal tag recoveries based on the harvest rate in those fisheries. Thus recoveries are imputed for certain fisheries. It may be more appropriate to use this same technique directly in the model and compute the recoveries in that manner. Regardless of these problems and inconsistencies, the model appears to be underestimating impacts prior to 2001 (Figure 15) and overestimating these impacts in 2002 and 2003. Further investigation of the manner in which fisheries were conducted in 2002 and 2003 may clarify why the model seems to underestimate the ISBM index prior to 2001 and overestimate the ISBM index after 2001.

**Table 10: Correlation of pre and post season for Washington coast stocks**

<b>Stock</b>	<b>Correlation Coefficient (<math>\rho</math>)</b>	<b>Avg Bias ((Post- Pre)/Post)</b>
Hoko	NA	NA
Grays Harbor	-0.28	-33%
Queets	-0.55	16%
Hoh	-0.72	23%
Quillayute	-0.74	22%



**Figure 15: Washington coast pre and post season performance**

### 6.2.1.3 Columbia River and Oregon Coast

The Columbia River is one of the only systems which has adequate tag code representation of the stock aggregates that are being monitored, both pre-season and post season. However, the indices do not track the model well (Figure 16). Even though the overall trend may be captured, the post season analysis on the Upriver Bright population is always higher than the pre-season model. The Deschutes and the Lewis post season indices are consistently below the pre-season estimate.

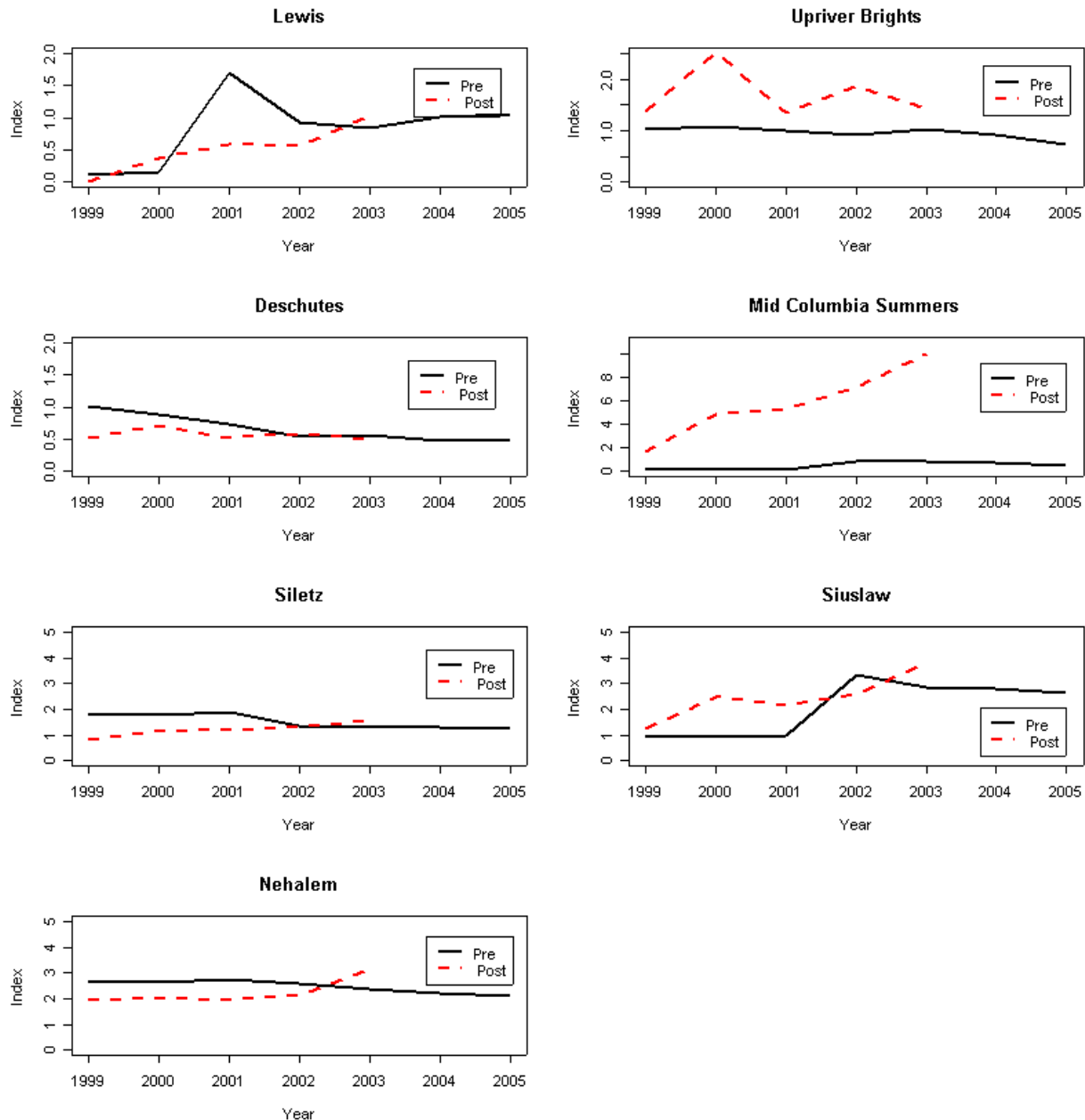
The Mid Columbia Summer ISBM index is consistently underestimated by the model (Figure 15). This may be due to several factors for this stock, as in recent years the terminal harvest levels have increased as a result of the reduced interim escapement goal for this stock relative to the base period and because the CWT group of fish (marked populations) is also mass marked and is subjected to selective fisheries management strategies, and this may be some of the reasons for the large discrepancies.

The Oregon Coast stocks seem to track well in the pre and post season (Figure 16). However, the abundance of both the Siletz and Nehalem appear to be over-predicted by the model. The Siuslaw seems to perform better than the other two though the average bias is positive in this case. The Oregon coast has similar problems as the Washington coast where the Salmon River indicator tag program is used to evaluate the impacts of these fisheries, and create pseudo recoveries in terminal fisheries based on harvest

rates observed in those fisheries. It would be more appropriate to have indicator programs on each of these rivers.

**Table 11: Correlation of pre and post season for Columbia River and Oregon coast stocks**

<b>Stock</b>	<b>Correlation Coefficient (<math>\rho</math>)</b>	<b>Avg Bias ((Post- Pre)/Post)</b>
Upriver Brights	0.40	38%
Deschutes	0.19	-35%
Lewis River	0.56	-47%
Mid-Columbia Summers	0.83	94%
Nehalem	-0.98	-22%
Siletz	-0.76	-43%
Siuslaw	0.65	27%



**Figure 16: Oregon coast pre and post season performance**

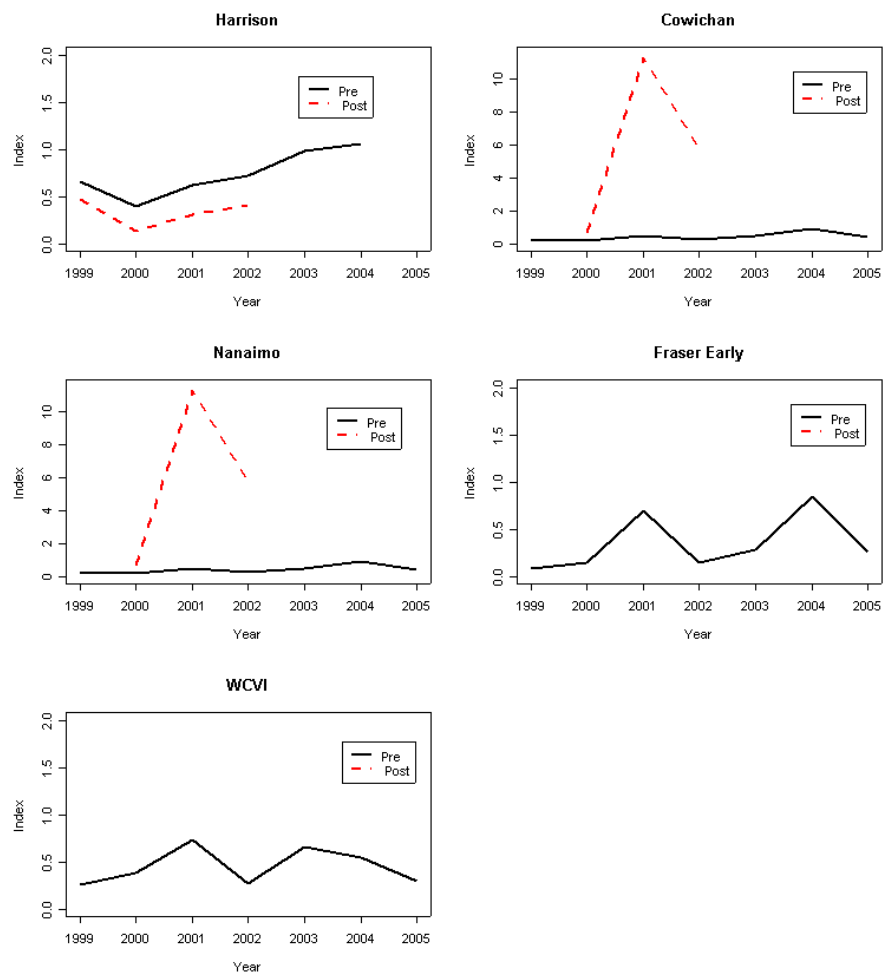
#### 6.2.1.4 Canadian Stocks

The Canadian stocks encountered in US fisheries with adequate tag recoveries and coverage are the Harrison River, the Nanaimo and the Cowichan (Figure 17). The Harrison seems to be over-predicted by the model, but the Lower Georgia Straits (namely the Cowichan and Nanaimo) seem to be under-predicted (the magnitude of the bias is very high for the Lower Georgia Strait stock group), and the reason for this is probably due to the low exploitation rate in these fisheries during the base period. However, both sets of data use the model base period information (Table 6) and hence these inaccuracies may be entirely due to using the model base period data.



**Table 12: Correlation of pre and post season for Canadian stocks**

<b>Stock</b>	<b>Correlation Coefficient (ρ)</b>	<b>Avg Bias ((Post-Pre)/Post)</b>
Harrison	0.93	-104%
Cowichan	0.89	87%
Nanaimo	0.89	0
Fraser Early	NA	NA
WCVI	NA	NA



**Figure 17: Canadian pre and post season performance (Stocks not included are Upper Georgia Strait and North Central BC).**

## 6.2.2 CANADIAN ISBM FISHERIES

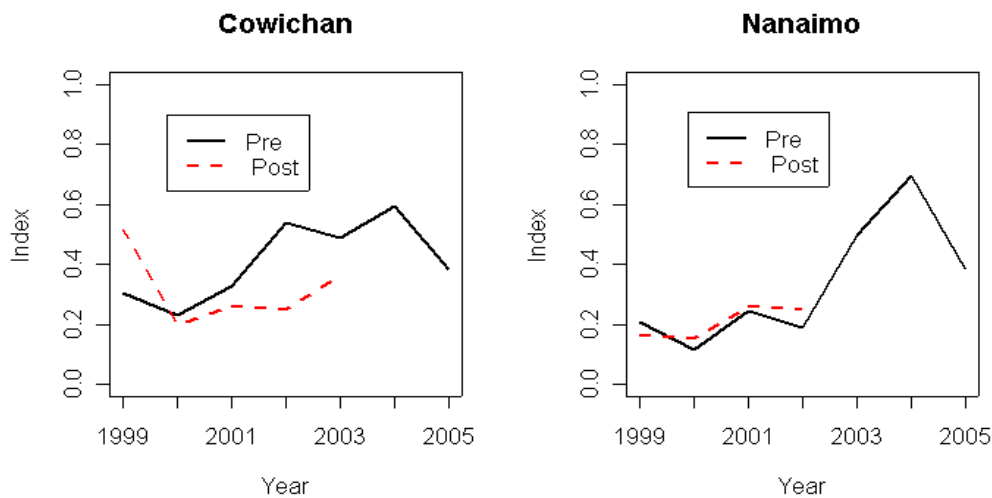
Canadian fisheries and stocks were also evaluated using similar criterion as the US fisheries. It should be noted that the Canadian CWT coverage although with a much longer tagging history in certain cases, is not as extensive as the US stock coverage. Hence, assumptions about relationships between an individual tagging program and how it relates to larger spatial areas have to be made. This may be one of several limitations of calculating a meaningful index for these areas.

**Table 13: Correlation of pre and post season for Canadian stocks in Canadian ISBM fisheries**

<b>Stock</b>	<b>Correlation Coefficient (<math>\rho</math>)</b>	<b>Avg Bias ((Post-Pre)/Post)</b>
Cowichan	-0.01	-31%
Nanaimo	0.67	7%
Upper Georgia Straits	-0.67	-2492%
FRL (Harrison)	0.02	-270%
Upper Fraser	NA	NA
WCVI	0.78	-135%
Northern BC	NA	NA

### 6.2.2.1 Lower Strait of Georgia (Cowichan & Nanaimo)

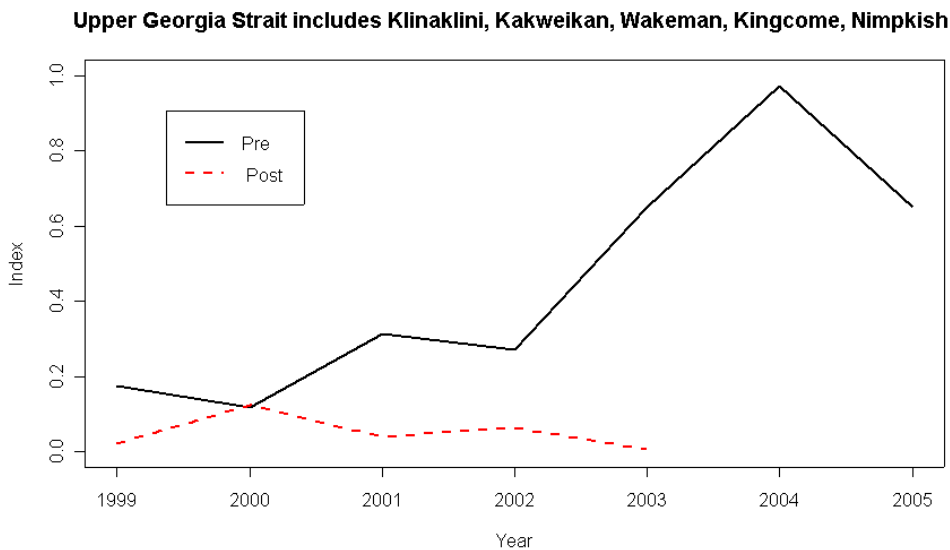
This is the only stock complex that has adequate coverage with both stocks having CWT representation. In recent years however, it has been pointed out that the Nanaimo stock has no representation in the base period and the Cowichan stock has been used as a surrogate for modeling and management purposes. For that reason, computation of post season indices for the Nanaimo are being discontinued. In addition, methods to disaggregate the Cowichan and the Nanaimo stocks have not been done correctly, and CDFO has decided to keep the Lower Georgia Strait stock complex as one group and not disaggregate it as has been done in the past. The pre and post season estimates track quite well (figure 18). However, the manner in which Nanaimo was treated from the model may have been inaccurate and as a result the CTC is no longer computing the index for Nanaimo (although it had the lowest bias of any ISBM stock being analyzed).



**Figure 18: Pre and post season performance for Lower Georgia Strait ISBM fisheries**

#### 6.2.2.2 Upper Strait of Georgia (Klinaklini, Kakweikan, Wakeman, Kingcome, Nimpkish)

Upper Georgia Straits stocks are represented by Quinsam hatchery. This is a fairly extensive area and the coverage is fairly limited by the use of just one indicator stock for this area. The fisheries on this stock have been completely eliminated due to depressed Chinook population status on stocks inside Georgia Straits. As such, the model and the CWT data are completely inconsistent and the worst of any of the stocks analyzed. The degree of bias is extremely high (>2000%) and so is the poor correlation (Table 11).



**Figure 19: Pre and post season performance for Upper Georgia Strait ISBM fisheries**

#### 6.2.2.3 Fraser Late (Harrison)

Fraser Late is one of the only stocks that have both a model component as well as a hatchery component. However these two sets of data don't track very well (Table 11). The structural changes in some of the

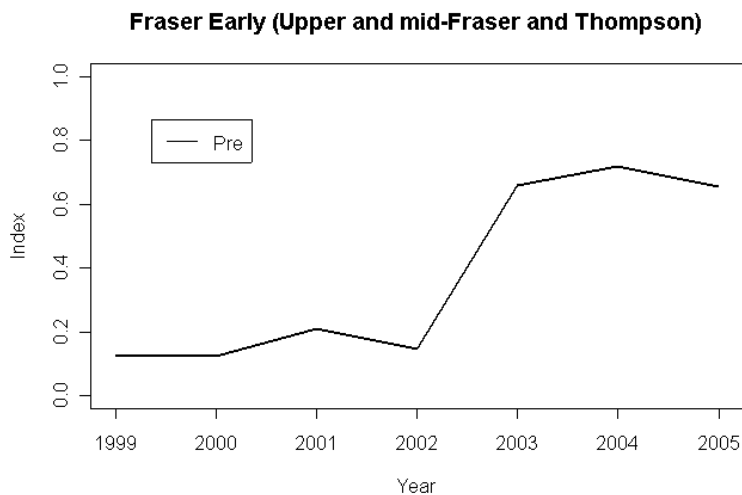
West Coast of Vancouver Island fisheries may be partially responsible for these changes. However, the fact that there is a mixing of some base period exploitation rates from the model when comparing the existing CWT recovery data may also be partially responsible for the poor correspondence.



**Figure 20: Pre and post season performance for Fraser Late's ISBM fisheries**

#### **6.2.2.4 Fraser Early (Upper Fraser, mid-Fraser, Thompson)**

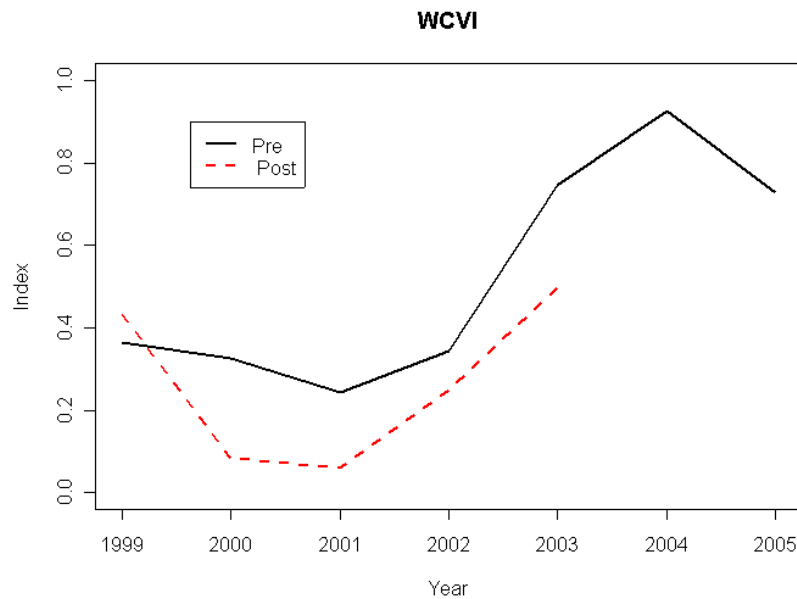
This stock grouping covers a fairly large area of the upper Fraser and includes several depressed Chinook stocks. However, there is no indicator tag program to assess impacts on this stock post-season as is shown below (Figure 21). However, if the model is accurate, the impacts on this stock have been consistently rising with the increase in the Abundance Index and associated allowable catch for the WCVI ocean fisheries.



**Figure 21: Pre season performance for Fraser Early ISBM fisheries**

#### 6.2.2.5 West Coast of Vancouver Island Falls (Artlish, Burman, Gold, Kauok, Tahsis, Tashish, Marble)

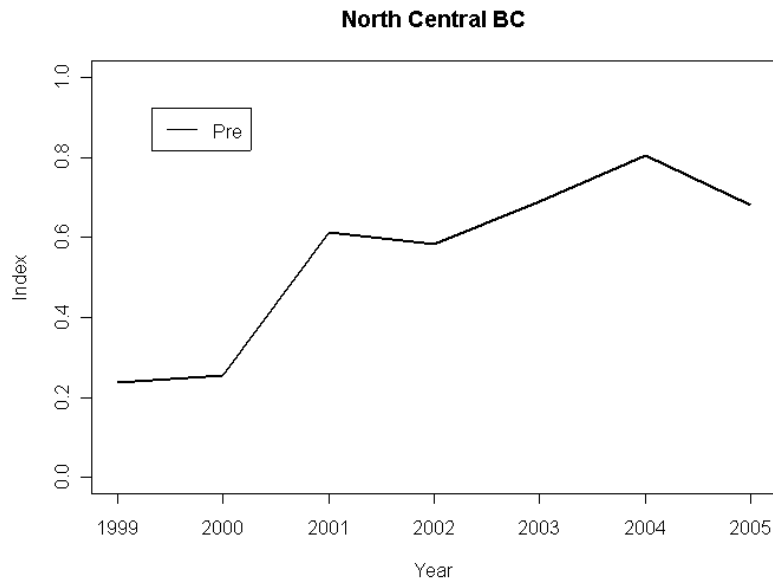
The West Coast of Vancouver Island covers a distance of greater than 600 kilometers in length. However, only one indicator tag group, from the Robertson Creek hatchery (in and around Barkley Sound, Figure 12) is used to model impacts on seven different river systems. This single index tracks fairly well (Figure 22 and Table 13) though, and is biased low relative to post season indices compared to pre-season estimates.



**Figure 22: Pre and post season performance WCVI ISBM fisheries**

#### 6.2.2.6 North/Central BC (Yakoun, Nass, Skeena, Area 8)

The North central BC area is an extremely large area, but no indicator tag codes are representative of the impacts in this region due to poor recoveries in these fisheries. Hence, there is no post season tracking of this index. However, if we track this index for all of these stocks, and if the model is accurate, it appears that the index has been increasing due to the larger fisheries in recent years (Figure 23).



**Figure 23: Pre season performance NCBC fisheries**

#### 6.2.2.7 US Stocks (with CWT Indices Stillaguamish and Green River)

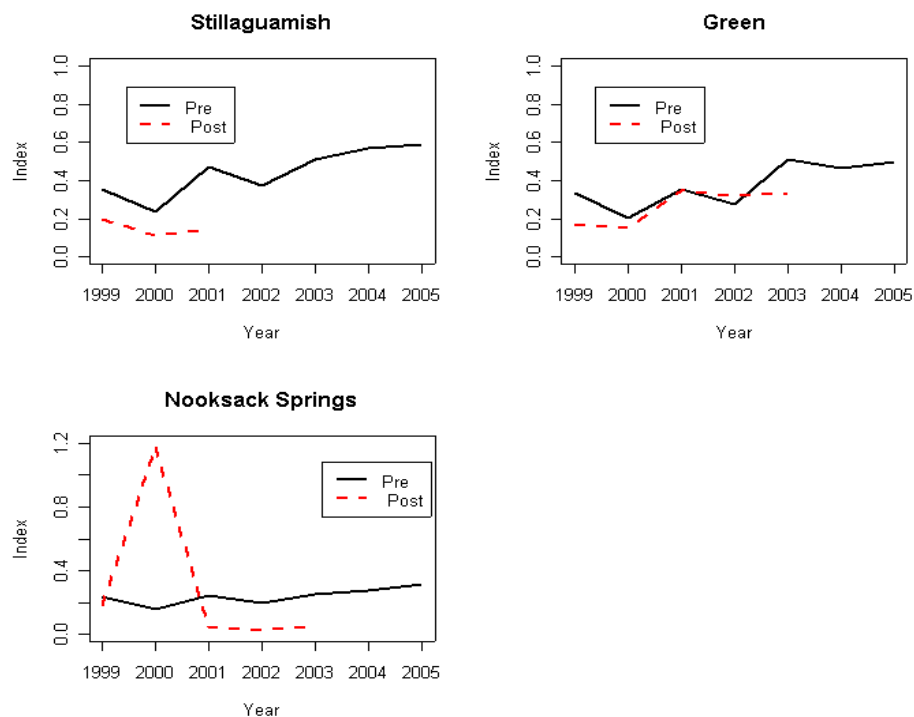
Post season indices for the Green River and Nooksack Springs are available until 2003. However, the tag code used for Nooksack Springs is questionable. The Stillaguamish has some incomplete coverage as the tagging program was stopped in recent years as a result of decreased funding. For that reason, the Green River is the only real indicator stock to measure what the harvest impacts are in Puget Sound fisheries. Regardless of the limited information due to reduced tagging programs and few indicator stocks, the index is biased low for all three cases (Table 14). This is likely due to the harvest management restrictions put in place to address weak stock and ESA concerns.

**Table 14: Correlation of pre and post season for US stocks in Canadian ISBM fisheries**

<b>Stock</b>	<b>Correlation Coefficient (<math>\rho</math>)</b>	<b>Avg Bias ((Post-Pre)/Post)</b>
Nooksack Springs	-0.82	-327%
Skagit Springs	NA	NA
Skagit Falls	NA	NA
Stillaguamish	0.42	-139%
Green	0.56	-34%
Lake Washington	NA	NA
Snohomish	NA	NA
Washington Coast (Queets)	NA	NA

Lewis River	NA	NA
URBS & Deschutes	NA	NA
Columbia Upriver Summers	NA	NA
Northern Oregon Coast	NA	NA

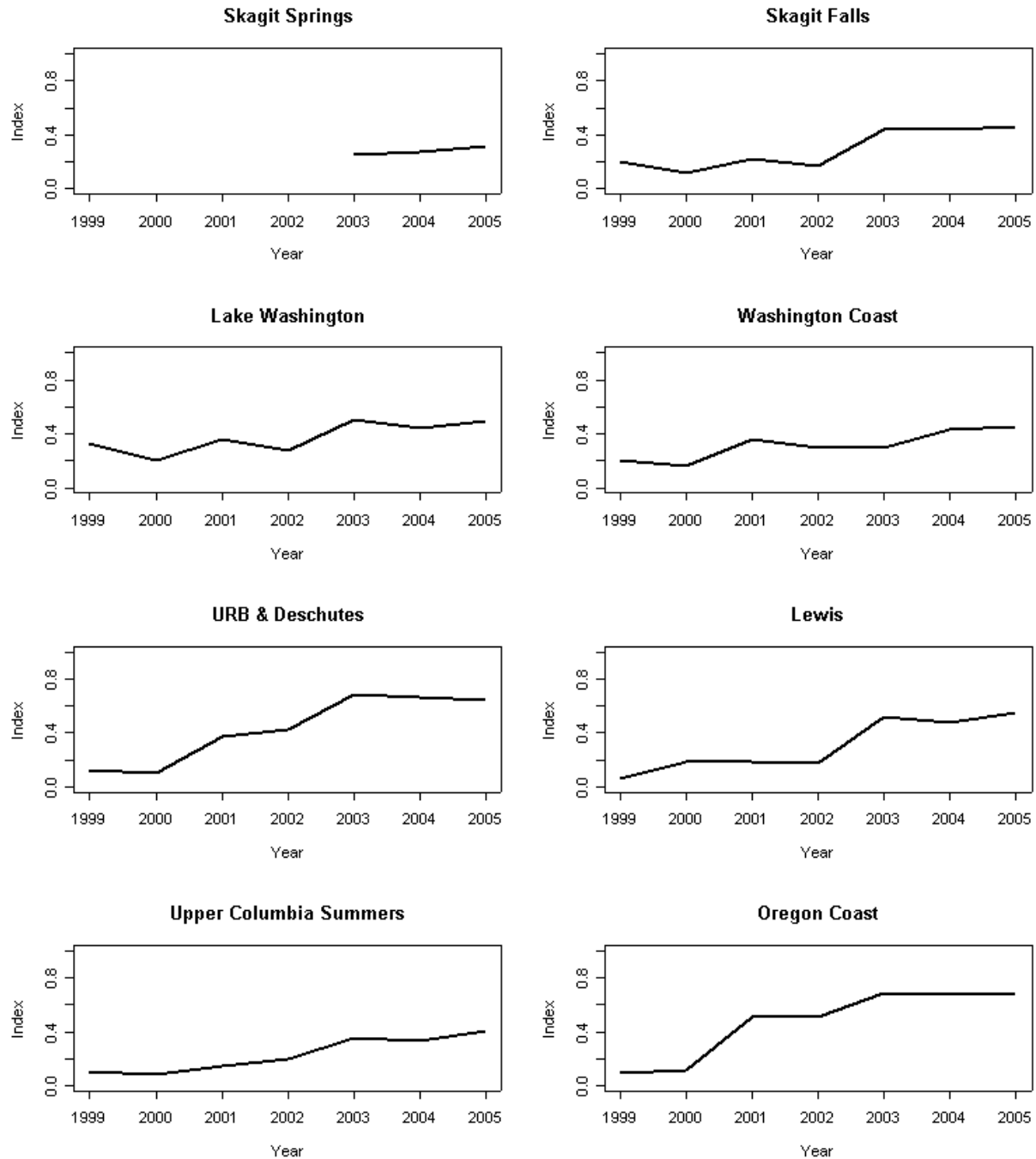
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**Figure 24: Pre and post season performance On US-stocks with sufficient CWT recoveries**

#### 6.2.2.8 Other US Stocks with insufficient CWT data

Due to inadequate tag recoveries in Canadian fisheries, there are no post-season performance evaluation measures for the other US stocks (Figure 25). Most of the Puget Sound and Washington Coast stocks appear to be below the allowable impact (Figure 25), but Columbia River and Oregon Coast impacts seem to have increased in recent years based on the model. In all cases though, escapement goals are being met or fisheries are severely restricted or closed in order to meet escapement objectives over the long term.



**Figure 25: Pre season performance on other US stocks with insufficient CWT recoveries**

### 6.3 DATA PROBLEMS

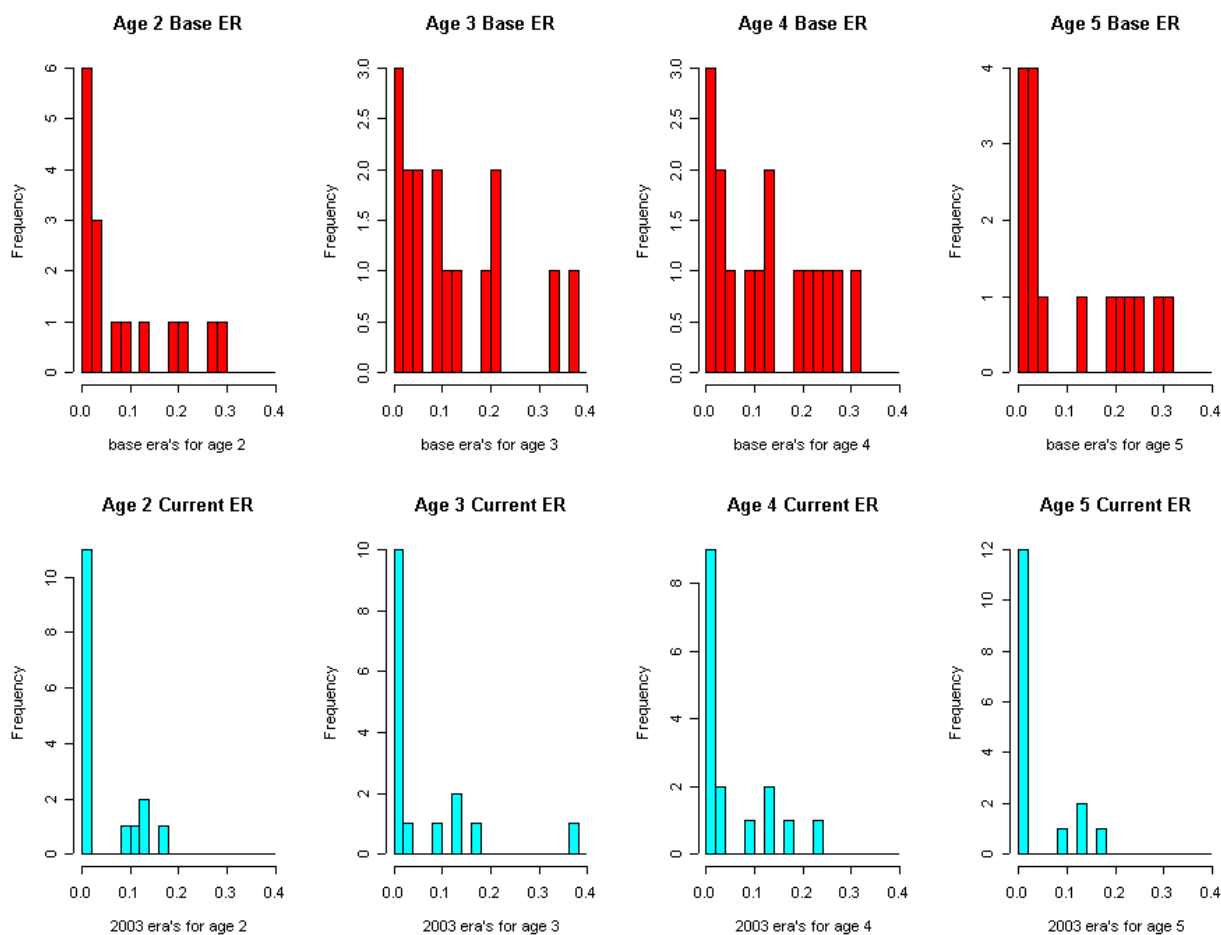
Issues with simple data quality are ignored while computing this index. The index is always computed relative to the 1979 to 1982 base period. However, insufficient recoveries or tags from some key programs (and fisheries) are missing in those years in the base period. In addition, fishing patterns have significantly changed from the base period, which makes a direct comparison difficult. Finally, problems



with sampling issues in recent fisheries (either because mark selective fishery management techniques are being used or because of budget cuts that have reduced or eliminated monitoring and evaluation programs) makes this index even harder to compute.

### 6,3,1 Base Period data issues

The ISBM ceiling index has an implicit assumption that the fisheries or fishing structure should not have changed drastically relative to the base period. This assumption is seriously flawed as, due to conservation concerns, overall harvest rates for these fisheries have been drastically cut back, especially since 1990 (Figures 26 and 27 are computed using equal weight to terminal and pre-terminal fishery harvest rates). The histograms, which are based upon data on which there were indices computed for each jurisdiction in 2003, show that relative to the base period CWT data for both the Canadian and the US jurisdictions for stocks on which we compute this index, these harvest rates have dropped.



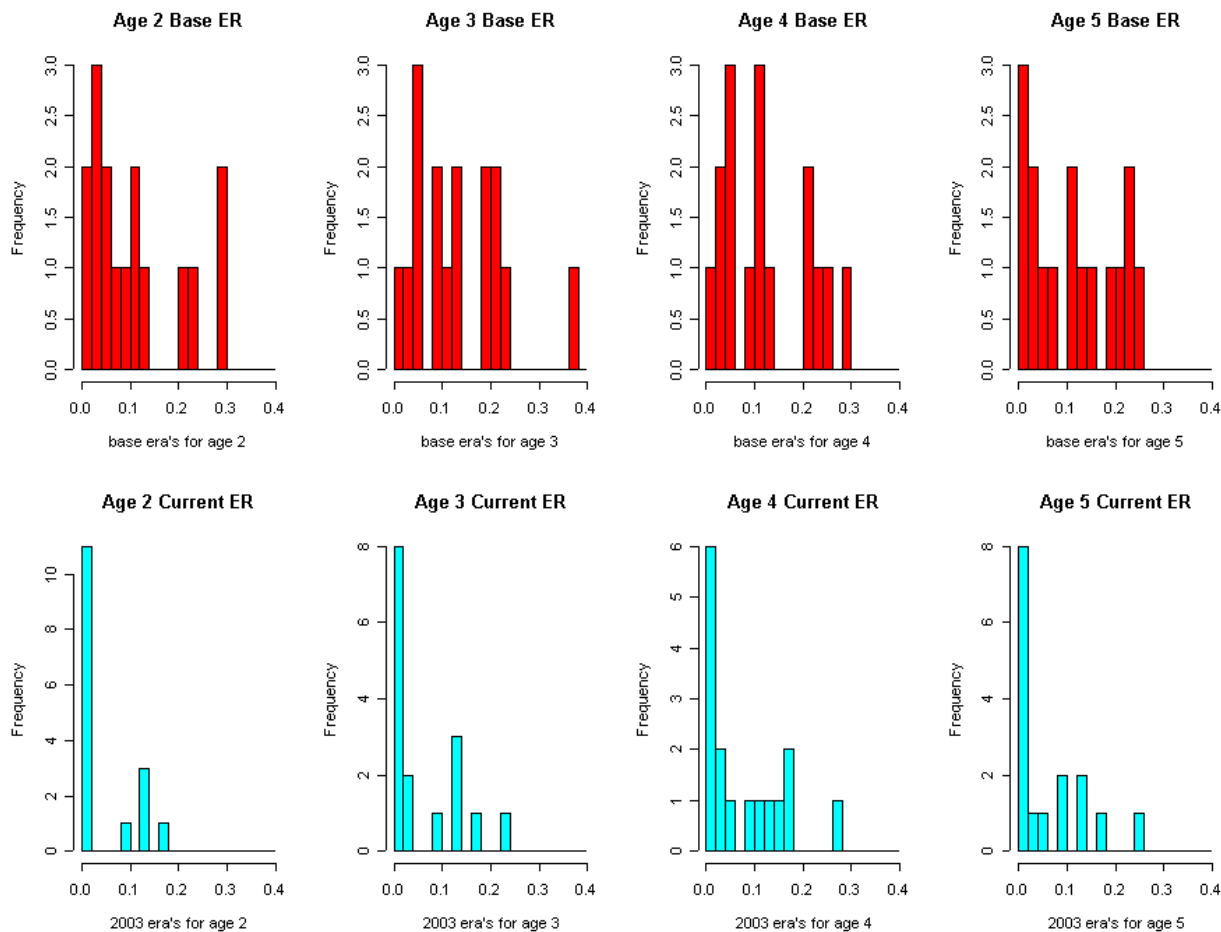
**Figure 26: Base period exploitation based on CWT data versus current (2003) exploitation rates by age for Canadian ISBM indices that are computable**

In the US a similar pattern exists as well for stocks for which CWT data is available and an index is computable (Figure 26). The mode and skew of the distributions in harvest rates (Figure 26 and 27) have all shifted to the left from the base to the current time (2003 calendar year) indicating that these

exploitation rates have dropped significantly in these fisheries even though the overall abundance was fairly high in the ocean for most Chinook stocks in 2003.

Regardless, survivals in the late 1970's and early 1980's were high. Fisheries were operating at their peak during that period in various ISBM fisheries. Since then, gear modifications and time and area closures have moved these fisheries to more compressed seasons with complete elimination of fisheries in certain areas. Hence the assumption that fisheries today are similar to the base period may no longer be valid.

The opposite has happened in some areas as well. For instance, fisheries on the Oregon Coastal Chinook in the Siletz and Siuslaw were practically non-existent during the base period (Table 1, Appendix 11). Since then, a major in-river sport fishery has been developed on those stocks and hence the higher ISBM index. This is true in the case of the Columbia Upriver Summers as well, where the CTC has adopted and managers are using a dramatically reduced interim escapement goal.



**Figure 27: Base period exploitation based on CWT data versus current (2003) exploitation rates by age for US ISBM indices that are computable**

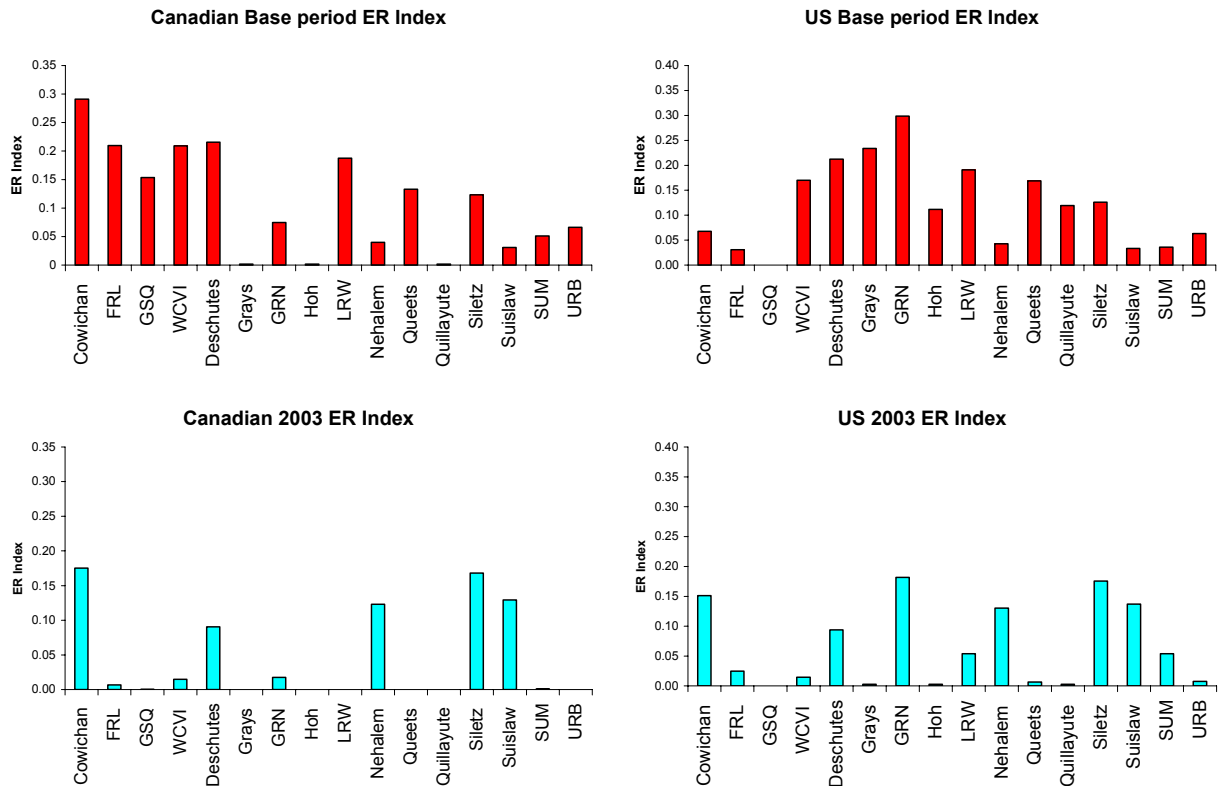
We developed an absolute measure of fishing intensity using the following equation that we call the ERI:

$$ERI_t = \frac{\sum_{i=2}^5 C_{i,f}}{\sum_{i=2}^5 A_{i,f}}$$

where C is the catch in an ISBM fishery (by age (i)) and A is the abundance in the fishery (either terminal or pre-terminal).

We weighted this index by terminal and ocean fisheries (equal weight). Our rationale to do so was the fact that these indices were based on different abundances in terminal and pre-terminal fisheries, but we weren't sure to bias the weight by the magnitude of the abundance or by the magnitude of the catch based on the proportion caught of the available population at each age in the fisheries.

This graph shows us a relative index of fishing intensity on the different CWT stocks for which we currently estimate an ISBM index. The figure (Figure 28) indicates that both the Canadian and the US ERI have significantly declined in recent years as compared to their base period fisheries. However, for some stocks, such as the Oregon coastal stocks and the Columbia Upriver Summers, the ERI suggests an increase in the overall exploitation relative to the base. In the US ISBM fisheries, the harvest impacts on the Cowichan stock have also increased relative to the base period.



**Figure 28: Exploitation Rate Index for different stocks in US and Canadian ISBM fisheries**

Finally, numerous tag programs began after the base period and even though some assessment data may be collected currently, these codes have no base period data and so assumptions need to be drawn from other tag codes or stock groupings to assess the base data (Table 15).

**Table 15: Tag programs with limited base data**

Stock Group	ISBM Stock	CWT Stock	Stock associated with Base data from STK file
Lower Strait of Georgia	Cowichan Nanaimo	Cowichan Big Qualicum River	GST
Fraser Late	Harrison	Chilliwac	FRL
North Puget Sound Natural Spring	Nooksack Spring Skagit Spring	Nooksack Spring N/A	NKS
Puget Sound Natural Summer/Falls	Skagit Stillaguamish	N/A Stillaguamish Fall Fing	SKG base period HR STL

### 6.3.2 Inadequate coverage of CWT stocks

This problem has two degrees of complexities. For the base period data, assumptions and linkages were made for Fraser Early, North Central BC and Puget Sound and how they relate to the model. However, there are no tag codes to represent these stocks in a post season evaluation. Hence, the model was relied upon to directly generate these estimates, without any way to verify the accuracy of these estimates post season (Table 16).

**Table 16: Stock groups with no CWT coverage**

Stock Group	ISBM Stock
Fraser Early (springs and summers)	Upper Fraser Mid Fraser Thompson
North/Central BC	Yakoun Nass Skeena Area 8
Puget Sound	Snohomish Skagit Falls Skagit Springs Lake Washington*

\*this stock had base coverage but in recent years there is no tagging from UW

While not as serious a problem, harvest data in terminal fisheries for most of these stocks was derived, we assume a single stock represents many stocks, e.g. Queets represents most of Washington coast, Salmon River represents all of Oregon coast. This may be problematic as these are all independent stocks and we use only one tag code for a large area. In a study by Hilborn et. al. (2003), it was noted that for a highly studied Bristol Bay sockeye system, that populations even in very close proximity to one another behaved very differently. Thus assuming that one tag code represents the dynamics of all stocks is somewhat misleading as they may behave very differently in the ocean. A list of the stock groups that are represented by a tag code of another system are listed below (Table 54)

**Table 17: Stock groups with associated coverage from another system**

--	--	--

Stock Group	ISBM Stock	CWT Stock associated from another system
Upper Strait of Georgia	Klinaklini Kakweikan Wakeman Kingcome Nimpkish	Quinsam
West Coast Vancouver Island Falls	Artlish Burman Gold Tahsis Tashish Marble Kauok	Robertson Creek
Washington Coastal Fall Naturals	Grays Harbor Hoh Quillayute	Queets Queets Queets
Col River Falls	Deschutes	Upriver Bright
Far North Migrating Oregon Coastal Falls	Nehalem Siletz Siuslaw	Salmon River Hatchery Salmon River Hatchery Salmon River Hatchery

In Canada there are indicator stocks for very large areas with very little stock specific information (WCVI represents the entire West Coast of Vancouver Island, encompassing 7 individual stocks, while Upper Georgia Strait also represents 5 stocks). For two stock aggregates there is no way to really assess performance as no indicator tag code even exists (Table 16).

### 6.3.3 Inconsistencies in analyzing two different sets of data

As a function of limited indicator stock and CWT coverage, the CTC has been forced to mix and match different kinds of data to compute an index. Tables 4 (preseason) and (Tables 6, 7 & 8) post season show the varieties and differences in the methods used to generate these indices. The problems in making sense out of these indices are further confounded as we are mixing two different data sources.

In the preseason projections (Table 4, Figure 6) the CTC mix changes from base for certain stocks from the FRAM model (PFMC 2003) with the CTC-model. In addition, the CTC mixes terminal harvest rates on a stock assuming that the harvest occurs across all ages equally with a model stock complex (Figure 7, Table 4 external harvest rate methods).

For the post season analysis two problems are created. The first issue is that the CTC mixes and matches different base period harvest rates derived from other stocks or data sources and associates them with a stock (Table 7, Table 8). To make this even worse, in some cases the CTC combines base period data from a different stock with current harvest rates for a particular stock, overwriting the tag based exploitation rate in a certain fishery for that stock. This makes it very difficult to understand whether this index for the stock is meaningful to the base as no data existed for this stock in the base period.

The second issue that arises in the post season analysis is similar to the pre-season analysis where the CTC mixes and matches terminal harvest rates for certain fisheries and overwrite tag data for those fishery specific harvest rates (Table 7 Figure 13). One of these pieces of data are from a hatchery (CWT) while the other information comes from a terminal harvest rate on a wild stock (or hatchery wild

composite stock). This may not be that serious an issue, but the result is mixing different pieces of information on fisheries and CWT data to compute this index.

#### **6.3.4 Recent sampling data issues**

Due to recent changes in fisheries and budget cuts experienced by agencies, the sampling coverage has decreased in certain fisheries (e.g. WCVI troll and sport fisheries). In addition, mass marking has made some of the data gathering issues more prominent, and the fact that directed fisheries on tagged stocks occur, make this index meaningless unless we the CWT estimates are corrected in these fisheries for the indicator stocks (SFEC 2002).

Escapement data from some hatcheries is also suspect (JCDAW 2003) and thus if important escapement information is missing (either because of incomplete sampling at the hatchery or because of strays), these indices will not mean much. Further, if the stray rates on indicator stocks or sampling issues have gotten exacerbated in recent years as compared to the base period, estimates and biases become more problematic.

Even in the current procedure, the CTC mixes terminal harvest rates with CWT data, and this terminal harvest rate is based on catch and escapement data for the system of concern. The CTC is aware of how problematic some of these escapement estimates are, and thus the imprecise escapement measures; terminal harvest rate estimates are also meaningless and thus the index is further confounded, and difficult to make sense out of.

### **6.4 ALGORITHM PROBLEMS**

ISBM indices are computed using adult equivalence (AEQ's) rates. However, there is missing data due to incomplete broods for any given year. In this report, we developed a theoretical exercise for an analysis on incomplete versus complete broods. We used 2000 calendar year Upriver Brights as an example. Thus, we assume that in year 2000 (as the true AEQ's are not available) average AEQ's for all 3 ages (Appendix 12) with the time series prior to 2000. The average method for incomplete broods is compared to the theoretical complete brood (using 2000 Calendar year AEQ's from the 2005 ERA as we have complete broods for the 2000 calendar year by 2003 calendar year). The bias shown in the example developed is 2% but this could be greater or lower depending on the magnitude of difference between the average and true AEQ's.

## **7 ACKNOWLEDGEMENTS**

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# APPENDIX 1. CALCULATION OF PRESEASON ISBM INDICES FOR PUGET SOUND STOCKS

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# METHODS FOR COMPUTING PRESEASON INDEX FOR PUGET SOUND

The preseason ISBM indices for Puget Sound Stocks (NKS, SKS, Lake Washington, Green, STL, SKG, SNO) are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input	Output
2004 FRAM ISBM.xls	spreadsheet	FRAM output files	
<b>get FP from Excel</b>	VB program	2004 FRAM ISBM.xls	ISBM fpa file
ISBM cei file	Text file	Projected catch	
ChinookModel	VB.net program	ISBM cei, & fpa file	ISBM ccc file
CalcISBM	VB.net program	ISBM ccc file	Model ISBM.xls

## Part 1: Calculate FP from FRAM model output.

- Base period for FRAM is 79-81 while base period for PSC is 79-82. Because we are using averages, trying to recreate 1982 FRAM base period exploitation rate in order to add one more year to the average is not worth the trouble as it probably won't make much difference in the average.
- For the base period, use **CKTlbse3.tam** file (created by Jim Scott) for the terminal area module. For the base period use **base.cmd** for the command file. Use the catch report driver files named **baseTM.drv** (don't use **AEQmorts.drv** because it includes SEAK stocks) and use the cohort report driver file named **popStat.drv**. One could calculate base period cohorts and catches in FRAM by setting all stock scalars and all catch controls to equal 1 and using any **cmd**, **ctki\*.tam** file. However, this does not provide a good estimate for inside Puget Sound stocks.
- For the current year, run FRAM and generate the reports with the current year **cmd** and **ctki\*.tam** file.
- The .cmd, .tam, and report driver files used to generate the catch and cohort reports for the base period and current year are summarized below (replace 9999 with the current year).

Period	.cmd file	Tam "T" file	Catch report driver	Cohort report driver
current	9999.cmd	CKTI9999.tam	baseTM.drv	popStat.drv
Base	Base.cmd	CKTlbse3.tam	baseTM.drv	popStat.drv

- Open the spreadsheet named "2003 FRAM ISBM.xls".
- 
- Use Excel to open the both the base period and current year \*TM.prn files as delimited, fixed width. Copy can paste the base period cohort data into the sheet named baseCohort and the current year cohort data into the page named currentCohort.
- Use Excel to open both the base period and current year \*popStat.prn files as delimited, fixed width. Copy can paste the base period catch data into the sheet named baseMort and the current year catch data into the page named currentMort.
- The pages with the word "base" calculates the base period AEQ exploitation rates (on rows 73 and 74). According to Equation 2, the base period AEQ catch (on rows 70 and 71) is divided by cohort (on rows 67 and 68). While Equation 2 shows a summation from the 1979 to 1982, the output from FRAM is the 1979-1981 average. Thus, you will not find a division by number of years in the spreadsheet. The upper half of each "base" sheet is the sum of catch by fishery, age, and time step. This may include marked and unmarked + yearling and fingerling. The results are summed by terminal or pre-terminal fisheries, i.e. divide by mature or immature cohort respectively in Equation 2 (rows 73 and 74).

- The pages with the word “ISBM” calculates the ISBM index (cell B79) from the sum of current year AEQ catch (on rows 70 and 71) divided by the sum of base period AEQ exploitation rates (on rows 73 and 74) multiplied by the current year cohort (on rows 67 and 68) as directed by Equation 1. The upper half of each “ISBM” sheet is identical to the “base” pages.
- Apparently, the current year freshwater net (row 64) and freshwater sport (row 63) in the \*TM.prn are base period catches, not the current year catch. Therefore, you need to replace the current year freshwater net and freshwater sport data in the sheets named “ISBM” with the same data found in another spreadsheet named \*chintamm.xls. You will not find age specific data so assume they are all age 5 in time step 3. The cell addresses for the freshwater net and freshwater sport data are summarized below:

	Sheet name	FW sport cell address	FW net cell address
NKS	NS		B47
SKG summer/fall	Sk	SUM(D45:G46) do not include extreme terminal	SUM(D36:G43)
SKG spring	Sk		SUM(B36:C43)
SNO	StSn	C49+E49	
STL	StSn	B51	
LkWA	SPS		C38
GRN (SPS)	SPS		C40

## Part 2: Copy the FP from PS ISBM from FRAM.xls to fpa files

1. Use the Visual Basic program named “*get\_FP\_from\_Excel*” to read the fp values in the spreadsheet named “*2605 PS ISBM from FRAM.xls*” (from step 1) and the fpa files in the ISBM folders (from step 2). The program will copy the fp values in the spreadsheet and paste them into the fpa file according to the table below. If they are not present in the original fpa file, the program will add ages (e.g. the data in the original NPSN file is not age-specific) and stocks (e.g. stock 14 or NKS is not present in the original fpa files, the data in the original NPSS file is not stock-specific, etc.). The results will be saved with a new name as shown in the table below.

Relationship between stock codes, fishery numbers, and fpa file names when transferring fp values from “2605 PS ISBM from FRAM.xls” to fpa files.						
Look for this stock name in *PS ISBM from FRAM.xls	Look for this fishery number in fpa file	Copy the stock-specific fp values from “*PS ISBM from FRAM.xls” into the following .fpa files. When done, make sure the fpa file names in the “*fpa.prn” file matches the filenames shown below.				
lkWA	12	NPSN Lk WA.fpa				
		SPSN Lk WA.fpa				
		NPSS Lk WA.fpa				
		SPSS Lk WA.fpa				
		WATR Lk WA.fpa				
		WAORSP Lk WA.fpa				
GRN (SPS)	12		NPSN grn.fpa			
			SPSN grn.fpa			
			NPSS grn.fpa			
			SPSS grn.fpa			
			WATR grn.fpa			
			WAORSP grn.fpa			

NKS	14	NPSN_lk_WA.fpa	NPSN_grn.fpa	NPSN_NKS.fpa	NPSN_PS_Falls.fpa	
		SPSN_lk_WA.fpa	SPSN_grn.fpa	SPSN_NKS.fpa	SPSN_PS_Falls.fpa	
				NPSS_NKS.fpa		
				SPSS_NKS.fpa		
		WATR_Lk_Wa.fpa	WATR_grn.fpa	WATR_NKS.fpa	WATR_PS_Falls.fpa	
SKG spr	14					NPSN_SKS.fpa
						SPSN_SKS.fpa
						NPSS_SKS.fpa
						SPSS_SKS.fpa
						WATR_SKS.fpa
SKG SF	15	NPSN_lk_WA.fpa	NPSN_Grn.fpa		NPSN_PS_Falls.fpa	
		SPSN_lk_WA.fpa	SPSN_Grn.fpa		SPSN_PS_Falls.fpa	
		NPSS_Lk_Wa.fpa	NPSS_Grn.fpa		NPSS_PS_Falls.fpa	
		SPSS_lk_WA.fpa	SPSS_Grn.fpa		SPSS_PS_Falls.fpa	
		WATR_Lk_WA.fpa	WATR_Grn.fpa		WATR_PS_Falls.fpa	
		WAORSP_Lk_WA.fpa	WAORSP_Grn.fpa		WAORSP_PS_Falls.fpa	
STL	16	NPSN_lk_wa.fpa	NPSN_Grn.fpa		NPSN_PS_Falls.fpa	
		SPSN_lk_wa.fpa	SPSN_Grn.fpa		SPSN_PS_Falls.fpa	
		NPSS_Lk_Wa.fpa	NPSS_Grn.fpa		NPSS_PS_Falls.fpa	
		SPSS_lk_wa.fpa	SPSS_Grn.fpa		SPSS_PS_Falls.fpa	
		WATR_Lk_WA.fpa	WATR_Grn.fpa		WATR_PS_Falls.fpa	
		WAORSP_Lk_WA.fpa	WAORSP_Grn.fpa		WAORSP_PS_Falls.fpa	
SNO fall	17	NPSN_lk_wa.fpa	NPSN_grn.fpa		NPSN_PS_Falls.fpa	
		SPSN_lk_wa.fpa	SPSN_Grn.fpa		SPSN_PS_Falls.fpa	
		NPSS_lk_wa.fpa	NPSS_grn.fpa		NPSS_PS_Falls.fpa	
		SPSS_lk_wa.fpa	SPSS_grn.fpa		SPSS_PS_Falls.fpa	
		WATR_Lk_WA.fpa	WATR_grn.fpa		WATR_PS_Falls.fpa	
		WAORSP_Lk_WA.fpa	WAORSP_Grn.fpa		WAORSP_PS_Falls.fpa	

If you need to update the fpa files manually, follow these steps. Open the fpa files and save with a new name as shown in the table above, e.g. SPSS\_lkWA.fpa. There should be a total 28 new fpa files. Open the spreadsheet “2605 PS ISBM from FRAM.xls” and find the page names as shown above, e.g. “LkWA”. Go to cell C117 (see example below). Copy the fp values in the spreadsheet and overwrite the existing data in the fpa file. For example, on the sheet named “NKS”, the stock number is 14. Copy 0.126 for age 3 to the fpa files named NPSN\_LkWA.fpa, NPSN\_Grn.fpa, NPSN\_NKS.fpa, and NPSN\_PS\_falls.fpa (highlighted in yellow). Notice the data from spreadsheet may go into 1 (SKF spr) or as many as 4 or the new fpa files (NKS). Keep the original value if there is none in the spreadsheet, e.g. age 2 = #DIV/0! The relationship between the stock names in the spreadsheet and the stock numbers in the fpa files are shown in the table above.

	A	B	C	D	E	F	G	H	I	J	K	L
115												
116		Catches		FPs for PSC mode								
117	Fishery	current	ISBM	Age 2	Age 3	Age 4	Age 5		stk = 14			
118	PgtNth N	9	29	#DIV/0!	0.126	1.205	#DIV/0!		NPSN_lk_WA.fpa	NPSN_Grn.fpa	NPSN_NKS.fpa	NPSN_PS_Falls.fpa
119	PgtSth N	28	65	#DIV/0!	0.505	0.437	0.000		SPSN_lk_WA.fpa	SPSN_Grn.fpa	SPSN_NKS.fpa	SPSN_PS_Falls.fpa
120	PgtNth S	15	44	0.250046	0.333	0.333	0.506				NPSS_NKS.fpa	
121	PgtSth S	3	10	0	0.375	#DIV/0!	#DIV/0!				SPSS_NKS.fpa	
122	WA/OR T	36	12	#DIV/0!	#DIV/0!	2.082	#DIV/0!		WATR_Lk_Wa.fpa	WATR_Grn.fpa	WATR_NKS.fpa	WATR_PS_Falls.fpa
123	Wash Ocn S	-	-	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
124	Wash Cst N	-	-	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
125	Freshwater Net	37	4									
126	Freshwater Sport	-	-									
	Totals	128	164									

In the fpa file, stock number is in the row headings. There are 4 rows per stock: the first is age 2, then age 3, etc. If the data in the original fpa file is not age specific (e.g. NPSN05.fpa), then copy and paste to create 4 rows and assume the data is the same for all age (see example below). Likewise, if the data in the original fpa file is not stock specific (e.g. NPSS05.fpa) then copy the data for stock 0 and paste for each missing stock.

12 , 0 , North Puget Sound Net psntfp03NEWAVGMar15.xls 2005 is 2000-2004  
average  
1979  
2005  
8 , 1979 1980 1981 1982 1983 1984 1985 1986 1987  
1988  
0 1 1 1 1 1 1 1 1  
1 1 1 1 1 1 1 1 1  
1 1 1 1 1 1 1 1 1  
1 1 1 1 1 1 1 1 1  
1 1 1 1 1 1 1 1 1  
16 1 1 1 1 0.899 0.572 0.558 0.687 0.633  
0.682 1 1 1 1 0.899 0.572 0.558 0.687 0.633  
0.682 1 1 1 1 0.899 0.572 0.558 0.687 0.633  
0.682 1 1 1 1 0.899 0.572 0.558 0.687 0.633  
0.682

Column headings = calendar year, NOT brood year. Update only the year in question.

### Part 3: Rerun the Chinook Model projection run using the ISBM fpa files to create the ISBM ccc files

2. Make a copy of the chinook model calibration folder that was used to calculate the SRFI index. Name the new folder “preseason ISBM”. This folder should have 2 files named SRFI.cei and SRFI.ccc. Rename the both as SRFI.cei and ISBM.ccc. Rename the p.op7 file as ISB Mp.op7. Send a copy of ISBM.cei to Canada and ask if there are any changes to Canadian catch expectations. If you can not find a copy of the SRFI.cei and SRFI.ccc files, then modify a calibration cei file by replacing the fp controls for the most recent year with the expected catch and rename it as ISBM.cei.
3. Copy the fpa.prn file and save with a new name, e.g. 2005lkWAfpa.prn. There should be a total of 5 new fpa.prn files: lkWA, GRN, NKS, SKS, and PS\_falls. Open the fpa.prn files and update the fpa file names as shown in the table above, e.g. change SPSS05.fpa to SPSS\_lkWA05.fpa.
4. Copy the p.op7 file and save with new file name, e.g. 0506lkWAp.op7. There should be a total of 5 new p.op7 files: lkWA, GRN, NKS, SKS, and PS\_falls. Open the p.op7 file and update the following items (from top to bottom)
  - prefix (e.g. lkWA), note maximum of 5 characters, e.g. PS\_FA (not PS\_FALLS)
  - name of CEI file e.g. ISBM.CEI
  - new fpa.prn file name (e.g. 2005lkWAfpa.prn).
5. Use chinookModel.exe to create a new projection run with each of the 5 new p.op7 files. You should end up with 5 new ISBM ccc files with the name of the prefix in the .op7 file, e.g. GRN.ccc, PS\_fa.ccc, etc (note only the first 5 characters of the prefix is used).

#### Part 4: Generate the ISBM indices using the ISBM ccc files

6. Run calcISBM.vb using the IDE (for an unexplained reason, the exe file does not work).
  - Enter the year for the ISBM index.
  - Click on “file”. Select one of the 5 p.op7 files.
  - The program will ask you to “pick a stock”. See the table below for the relationship between the 3 letter stock acronyms and the stock names. After you have selected a stock, click on “done picking stocks”.
  - The program will write the ISBM indices to a spreadsheet named “*model ISBM.xls*”.
  - Hint #1: end the program after each stock and restart the program before the next stock.
  - Hint #2: Run SKG and NKS separately. Option 1: if all stocks are in the same folder, then run “*SKG spr*” first, open the spreadsheet and rename “*NKS*” as “*SKS*” so it can not be overwritten. Then run “*NKS*”. Option 2: keep files for each stock in separate folders so SKS and NKS can not overwrite each other.
  - Hint #3: when you select PS\_FA as the op7 file, select SKG, STL, and SNO together as a group. CalcISBM.exe will add 3 new sheets to “*model ISBM.xls*” for each stock.
  - Hint #4: Run lkWA and GRN separately. Option 1: keep files for each stock in separate folders so LkWA and GRN can not overwrite each other. Rename the sheet “*PSN*” as “*PSN\_lkWA*” or “*PSN\_GRN*” as appropriate. Option 2: if all stocks are in the same folder, then rename the sheet “*PSN*” as “*PSN\_lkWA*” or “*PSN\_GRN*” as appropriate so it can not be overwritten when you select the other stock the op7 file.

Relationship between stock names and 3 letter acronyms when using the program named “calcISBM”.		
Escapement Indicator stock name in Calibration and ERA report	Stock name in *PS ISBM from FRAM.xls	Stock name in calcISBM.exe
Skagit (Summer/Falls)	SKG SF	SKG
Stillaguamish	STL	STL
Snohomish	SNO fall	SNO
Lake Washington	lkWA	PSN
Green R	GRN (SPS)	PSN
Nooksack	NKS	NKS
Skagit (Natural Springs)	SKG Spr	NKS

**TABLE 1.1(A): DATA AND COMPUTATION FLOW OF NOOKSACK PRESEASON US ISBM INDEX (FIGURE 6)**

Fishery	(1) average 1979-1981 (base period) harvest rates (FRAM)				(4) 2003 legal catch (ccc file)				(7) AEQ for all years				(10) cohort X base period exploitation rate				
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	
WA/OR T	0.000	0.001	0.004	0.000		0	0	0	0	0.62	0.87	0.99	1	0	0	0	0
PgtNth N	0.000	0.043	0.009	0.000	20	11		0	0	1	1	1	1	84.94	48.84	0.58	0
PgtSth N	0.000	0.010	0.035	0.048	0	0	0	0	0	1	1	1	1	0	0	0	0
Wash Cst I	0.000	0.001	0.000	0.000	0	0	0	0	0	0.62	0.87	0.99	1	0	0	0	0
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn	0.000	0.000	0.000	0.000	0	0	0	0	0	0.62	0.87	0.99	1	0	0	0	0
PgtNth S	0.155	0.004	0.021	0.057	0	14	5	0	0	0.62	0.87	0.99	1	5.79	61.87	22.37	0
PgtSth S	0.103	0.004	0.002	0.000	0	10	0	0	0	0.62	0.87	0.99	1	12.41	24.86	0.01	0
terminal S					0	0	0	0	0	1	1	1	1	0	0	0	0
Fishery	(2) 2003 harvest rates (FRAM)				(5) 2003 shaker mortality (CCC file)				(8) 2003 cohort (CCC file)								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	0.000	0.006	0.013	0.000	0	0	0	0	2530	1849	762	29					
PgtNth N	0.000	0.002	0.000	0.000	0	0	0	0	107	794	742	9					
PgtSth N	0.000	0.000	0.026	0.000	0	0	0	0	107	794	742	9					
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	2530	1849	762	29					
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	107	794	742	9					
Wash Ocn	0.000	0.000	0.000	0.000	0	0	0	0	2530	1849	762	29					
PgtNth S	0.001	0.001	0.006	0.028	3	2	1	0	2530	1849	762	29					
PgtSth S	0.001	0.002	0.000	0.000	9	2	0	0	2530	1849	762	29					
terminal S					0	0	0	0	107	794	742	9					
Fishery	(3) calculate FP for Chinook Model				(6) 2003 CNR mortality (CCC file)				(9) base period exploitation rates								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	0.000	10.770	3.084	0.000	0	0	0	0	0	0	0	0					
PgtNth N	0.000	0.057	0.000	0.000	0	0	0	0	0.793	0.061	0.001	0					
PgtSth N	0.000	0.000	0.742	0.000	0	0	0	0	0	0	0	0					
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0					
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0					
Wash Ocn	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0					
PgtNth S	0.003	0.140	0.264	0.489	8	4	1	0	0.002	0.033	0.029	0					
PgtSth S	0.005	0.490	0.000	0.000	12	2	0	0	0.005	0.013	0	0					
terminal S	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0					
(11) sum of AEQ total mortality =				87.63													
(12) sum of cohort X AEQ BPER =				261.66													
(13) US ISBM =				0.33													

**TABLE 1.1(B) NKS BASE PERIOD EXPLOITATION RATES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	347	55	0	0	204	50	0	0	99	29	0	0	99	14	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0	295	2073	0	0	267	28	0	0	157	25	0	0	76	15	0
PgtSth S	0	118	0	0	0	107	0	0	0	63	0	0	0	31	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	12	4	52	0	7	4	1	0	4	3	1	0	4	1	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	49	43	301	0	30	39	4	0	14	23	4	0	11	11	2	0
PgtSth S	98	18	1	0	64	16	0	0	30	9	0	0	26	5	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtNth N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
PgtSth N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
Wash Cst I	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
terminal N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
Wash Ocn	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtNth S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtSth S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
terminal S	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1

Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.791	0.061	0.001	0	0.791	0.061	0.001	0	0.796	0.062	0.001	0	0.792	0.061	0.001	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0.002	0.033	0.029	0	0.002	0.033	0.029	0	0.002	0.033	0.029	0	0.002	0.033	0.029	0
PgtSth S	0.005	0.013	0	0	0.005	0.013	0	0	0.005	0.013	0	0	0.005	0.013	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



**TABLE 1.1 (C): DATA AND COMPUTATION FLOW FOR NKS CANADIAN ISBM INDEX (FIGURE 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	0.62	0.87	0.99	1	8.83	37.8	0.18	0
Geo St T	0	10	0	0	0.62	0.87	0.99	1	9.41	961.12	0.01	0
North N	2	0	0	0	0.62	0.87	1	1	11.74	0.19	0	0
Centr N	1	1	0	0	0.62	0.87	1	1	9.91	11.33	0	0
WCVI N	44	114	0	0	0.62	0.87	1	1	44.43	156.6	0	0
J De F N	2	0	0	0	0.62	0.87	1	1	37.54	0.04	0	0
John St N	0	0	0	0	0.62	0.87	1	1	11.85	0.25	0	0
Fraser N	27	0	0	0	0.62	0.87	0.99	1	26.77	0.04	0	0
Geo St S	0	101	103	20	0.62	0.87	0.99	1	322.91	322.41	167.05	29.5

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	2530	1849	762	29
Geo St T	0	0	0	0	2530	1849	762	29
North N	0	0	0	0	2530	1849	742	9
Centr N	0	0	0	0	2530	1849	742	9
WCVI N	1	0	0	0	2530	1849	742	9
J De F N	0	0	0	0	2530	1849	742	9
John St N	0	0	0	0	2530	1849	742	9
Fraser N	0	0	0	0	2530	1849	762	29
Geo St S	19	14	7	1	2530	1849	762	29

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	12	9	1	0	0.003	0.02	0	0
Geo St T	10	41	0	0	0.004	0.52	0	0
North N	17	0	0	0	0.005	0	0	0
Centr N	13	11	0	0	0.004	0.006	0	0
WCVI N	0	0	0	0	0.018	0.085	0	0
J De F N	53	0	0	0	0.015	0	0	0
John St N	16	0	0	0	0.005	0	0	0
Fraser N	0	0	0	0	0.011	0	0	0
Geo St S	8	6	3	1	0.128	0.174	0.219	1.024

(8) sum of AEQ total mortality =	543.96
(9) sum of cohort X AEQ BPER =	2169.91
(10) Canada ISBM =	0.25

**TABLE 1.1(D): NKS BASER PERIOD EXPLOITATION RATES IN CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	177	0	0	0	160	0	0	0	94	0	0	0	46	0	0
Geo St T	0	5156	0	0	0	4677	0	0	0	2744	0	0	0	1339	0	0
North N	84	0	0	0	49	0	0	0	24	0	0	0	21	0	0	0
Centr N	56	59	0	0	33	53	0	0	16	31	0	0	14	15	0	0
WCVI N	363	854	0	0	213	775	0	0	104	455	0	0	89	222	0	0
J De F N	307	0	0	0	180	0	0	0	88	0	0	0	76	0	0	0
John St N	84	0	0	0	49	0	0	0	24	0	0	0	21	0	0	0
Fraser N	223	0	0	0	131	0	0	0	64	0	0	0	55	0	0	0
Geo St S	3128	1650	16581	1	1831	1497	221	6201	893	878	201	83	146	424	118	74

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	74	30	19	0	40	25	0	0	22	16	0	0	19	8	0	0
Geo St T	89	90	1	0	47	82	0	1	22	48	0	0	17	23	0	0
North N	16	1	0	0	8	1	0	0	4	1	0	0	4	0	0	0
Centr N	32	3	0	0	17	3	0	0	7	1	0	0	6	1	0	0
WCVI N	10	0	0	0	6	0	0	0	3	0	0	0	2	0	0	0
J De F N	8	0	0	0	4	0	0	0	2	0	0	0	2	0	0	0
John St N	19	2	0	0	10	1	0	0	4	1	0	0	3	0	0	0
Fraser N	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Geo St S	217	114	1147	0	127	103	15	428	62	61	14	6	52	30	8	5

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
Geo St T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
North N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
Centr N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
WCVI N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
J De F N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
John St N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
Fraser N	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
Geo St S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.02	0	0	0.003	0.02	0	0	0.004	0.021	0	0	0.004	0.02	0	0
Geo St T	0.004	0.52	0	0	0.004	0.52	0	0	0.004	0.52	0	0	0.003	0.52	0	0
North N	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0
Centr N	0.004	0.006	0	0	0.004	0.006	0	0	0.004	0.006	0	0	0.004	0.006	0	0
WCVI N	0.018	0.085	0	0	0.018	0.085	0	0	0.018	0.085	0	0	0.018	0.085	0	0
J De F N	0.015	0	0	0	0.015	0	0	0	0.015	0	0	0	0.015	0	0	0
John St N	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0
Fraser N	0.011	0	0	0	0.011	0	0	0	0.011	0	0	0	0.011	0	0	0
Geo St S	0.158	0.175	0.219	0.767	0.158	0.175	0.219	1.111	0.158	0.175	0.219	1.114	0.038	0.173	0.219	1.105

**TABLE 1.2(A): DATA AND COMPUTATION FLOW OF SKAGIT PRESEASON US ISBM INDEX (FIGURE 6)**

(1) average 1979-1981 (base period)																			
Fishery	harvest rates (FRAM)				(5) 2003 legal catch (ccc file)					(8) AEQ for all years					(11) cohort X base period exploitation rate				
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5			
WA/OR T	0.000	0.001	0.004	0.000		0	0	0	0	0.62	0.87	0.99	1	0	0	0			
PgtNth N	0.000	0.700	0.110	0.000		0	1	0	0	1	1	1	1	84.94	49.42	0.59			
PgtSth N	0.312	0.602	0.124	0.038		0	0	0	0	1	1	1	1	0	0	0			
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0.62	0.87	0.99	1	0	0	0			
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	1	1	1	1	0	0	0			
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0.62	0.87	0.99	1	0	0	0			
PgtNth S	0.001	0.010	0.056	0.047		0	2	2	0	0.62	0.87	0.99	1	5.79	61.87	22.42			
PgtSth S	0.002	0.050	0.074	0.039		0	3	0	0	0.62	0.87	0.99	1	12.41	24.86	0.01			
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	1	1	1	1	0	0	0			
Fishery	(2) 2003 harvest rates (FRAM)				(6) 2003 shaker mortality (CCC file)					(9) 2003 cohort (CCC file)									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5							
WA/OR T	0.000	0.001	0.031	0.000		0	0	0	0	2530	1849	763	30						
PgtNth N	0.000	0.050	0.033	0.000		0	0	0	0	107	804	747	9						
PgtSth N	0.000	0.061	0.038	0.011		0	0	0	0	107	804	747	9						
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	2530	1849	763	30						
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	107	804	747	9						
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	2530	1849	763	30						
PgtNth S	0.000	0.001	0.023	0.008		3	0	0	0	2530	1849	763	30						
PgtSth S	0.001	0.017	0.059	0.016		9	1	0	0	2530	1849	763	30						
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	107	804	747	9						
Fishery	(3) calculate FP for Chinook Model				(7) 2003 CNR mortality (CCC file)					(10) base period exploitation rates									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5							
WA/OR T	0.770	1.612	7.359	0.000		0	0	0	0	0	0	0	0						
PgtNth N	0.000	0.071	0.306	0.000		0	0	0	0	0.793	0.061	0.001	0						
PgtSth N	0.000	0.101	0.306	0.290		0	0	0	0	0	0	0	0						
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0						
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0						
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0						
PgtNth S	0.408	0.146	0.416	0.169		8	1	1	0	0.002	0.033	0.029	0						
PgtSth S	0.393	0.335	0.792	0.425		12	1	0	0	0.005	0.013	0	0						
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0						
(12) sum of AEQ total mortality =				31.18															
(13) sum of cohort X AEQ BPER =				262.3															
(14) US ISBM =				0.12															

**TABLE 1.2(B) SKS BASE PERIOD EXPLOITATION RATES IN US FISHERIES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	347	55	0	0	204	50	0	0	99	29	0	0	99	14	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0	295	2073	0	0	267	28	0	0	157	25	0	0	76	15	0
PgtSth S	0	118	0	0	0	107	0	0	0	63	0	0	0	31	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	12	4	52	0	7	4	1	0	4	3	1	0	4	1	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	49	43	301	0	30	39	4	0	14	23	4	0	11	11	2	0
PgtSth S	98	18	1	0	64	16	0	0	30	9	0	0	26	5	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtNth N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
PgtSth N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
Wash Cst I	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
terminal N	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1
Wash Ocn	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtNth S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
PgtSth S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
terminal S	454	965	70277	0	267	880	935	0	130	515	852	0	129	253	499	1

Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.791	0.061	0.001	0	0.791	0.061	0.001	0	0.796	0.062	0.001	0	0.792	0.061	0.001	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0.002	0.033	0.029	0	0.002	0.033	0.029	0	0.002	0.033	0.029	0	0.002	0.033	0.029	0
PgtSth S	0.005	0.013	0	0	0.005	0.013	0	0	0.005	0.013	0	0	0.005	0.013	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 1.2(C): DATA AND COMPUTATION FLOW OF SKAGIT SPRING CANADIAN PRESEASON ISBM INDIEX (FIGURE 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	0.62	0.87	0.99	1	8.83	37.8	0.18	0
Geo St T	0	10	0	0	0.62	0.87	0.99	1	9.41	961.12	0.01	0
North N	2	0	0	0	0.62	0.87	1	1	11.74	0.19	0	0
Centr N	1	1	0	0	0.62	0.87	1	1	9.91	11.33	0	0
WCVI N	44	114	0	0	0.62	0.87	1	1	44.43	156.6	0	0
J De F N	2	0	0	0	0.62	0.87	1	1	37.54	0.04	0	0
John St N	0	0	0	0	0.62	0.87	1	1	11.85	0.25	0	0
Fraser N	27	0	0	0	0.62	0.87	0.99	1	26.77	0.04	0	0
Geo St S	0	101	103	21	0.62	0.87	0.99	1	322.91	322.41	167.4	30.42

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	2530	1849	763	30
Geo St T	0	0	0	0	2530	1849	763	30
North N	0	0	0	0	2530	1849	747	9
Centr N	0	0	0	0	2530	1849	747	9
WCVI N	1	0	0	0	2530	1849	747	9
J De F N	0	0	0	0	2530	1849	747	9
John St N	0	0	0	0	2530	1849	747	9
Fraser N	0	0	0	0	2530	1849	763	30
Geo St S	19	14	7	1	2530	1849	763	30

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	12	9	1	0	0.003	0.02	0	0
Geo St T	10	41	0	0	0.004	0.52	0	0
North N	17	0	0	0	0.005	0	0	0
Centr N	13	11	0	0	0.004	0.006	0	0
WCVI N	0	0	0	0	0.018	0.085	0	0
J De F N	53	0	0	0	0.015	0	0	0
John St N	16	0	0	0	0.005	0	0	0
Fraser N	0	0	0	0	0.011	0	0	0
Geo St S	8	6	3	1	0.128	0.174	0.219	1.024

(8) sum of AEQ total mortality =	544.91
(9) sum of cohort X AEQ BPER =	2171.19
(10) Canada ISBM =	0.25

**TABLE 1.2(D): SKAGIT SPRING BASE PERIOD EXPLOITATION RATES IN CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	177	0	0	0	160	0	0	0	94	0	0	0	46	0	0
Geo St T	0	5156	0	0	0	4677	0	0	0	2744	0	0	0	1339	0	0
North N	84	0	0	0	49	0	0	0	24	0	0	0	21	0	0	0
Centr N	56	59	0	0	33	53	0	0	16	31	0	0	14	15	0	0
WCVI N	363	854	0	0	213	775	0	0	104	455	0	0	89	222	0	0
J De F N	307	0	0	0	180	0	0	0	88	0	0	0	76	0	0	0
John St N	84	0	0	0	49	0	0	0	24	0	0	0	21	0	0	0
Fraser N	223	0	0	0	131	0	0	0	64	0	0	0	55	0	0	0
Geo St S	3128	1650	16581	1	1831	1497	221	6201	893	878	201	83	146	424	118	74

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	74	30	19	0	40	25	0	0	22	16	0	0	19	8	0	0
Geo St T	89	90	1	0	47	82	0	1	22	48	0	0	17	23	0	0
North N	16	1	0	0	8	1	0	0	4	1	0	0	4	0	0	0
Centr N	32	3	0	0	17	3	0	0	7	1	0	0	6	1	0	0
WCVI N	10	0	0	0	6	0	0	0	3	0	0	0	2	0	0	0
J De F N	8	0	0	0	4	0	0	0	2	0	0	0	2	0	0	0
John St N	19	2	0	0	10	1	0	0	4	1	0	0	3	0	0	0
Fraser N	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Geo St S	217	114	1147	0	127	103	15	428	62	61	14	6	52	30	8	5

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
Geo St T	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
North N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
Centr N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
WCVI N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
J De F N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
John St N	13136	8765	70277	0	7690	7950	935	0	3752	4664	852	0	3232	2276	499	1
Fraser N	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72
Geo St S	13136	8765	80047	1	7690	7950	1065	5966	3752	4664	970	79	3232	2276	569	72

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.02	0	0	0.003	0.02	0	0	0.004	0.021	0	0	0.004	0.02	0	0
Geo St T	0.004	0.52	0	0	0.004	0.52	0	0	0.004	0.52	0	0	0.003	0.52	0	0
North N	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0
Centr N	0.004	0.006	0	0	0.004	0.006	0	0	0.004	0.006	0	0	0.004	0.006	0	0
WCVI N	0.018	0.085	0	0	0.018	0.085	0	0	0.018	0.085	0	0	0.018	0.085	0	0
J De F N	0.015	0	0	0	0.015	0	0	0	0.015	0	0	0	0.015	0	0	0
John St N	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0	0.005	0	0	0
Fraser N	0.011	0	0	0	0.011	0	0	0	0.011	0	0	0	0.011	0	0	0
Geo St S	0.158	0.175	0.219	0.767	0.158	0.175	0.219	1.111	0.158	0.175	0.219	1.114	0.038	0.173	0.219	1.105

**TABLE 1.3(A): DATA AND COMPUTATION FLOW OF SKAGIT FALL PRESEASON US ISBMI INDEX (FIGURE 6)**

Fishery	(1) average 1979-1981 (base period) harvest rates (FRAM)				(5) 2003 legal catch (ccc file)				(8) AEQ for all years				(11) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.000	0.000	0.000	0.000	0	0	0	0	0.58	0.83	0.98	1	0	0	0	0
PgtNth N	0.023	0.023	0.018	0.000	0	2	11	0	1	1	1	1	45.28	121.89	207.78	0.53
PgtSth N	0.000	0.090	0.191	0.654	0	305	761	395	1	1	1	1	49.49	420.12	1597.65	963.69
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0.58	0.83	0.98	1	0	0	0	0
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn	0.000	0.000	0.000	0.000	0	13	0	0	0.58	0.83	0.98	1	24.08	9.39	0.39	0.03
PgtNth S	0.001	0.007	0.002	0.062	0	11	0	35	0.58	0.83	0.98	1	156.89	230.83	13.7	109.08
PgtSth S	0.003	0.008	0.037	0.072	0	63	6	2	0.58	0.83	0.98	1	123.41	237.66	236.76	58.27
terminal S	0.000	0.000	0.000	0.000	0	0	0	33	1	1	1	1	26.85	0.22	0	42.38
Fishery	(2) 2003 harvest rates (FRAM)				(6) 2003 shaker mortality (CCC file)				(9) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0.000	0.000	0.000	0.000	0	0	0	0	18568	14342	8561	2025				
PgtNth N	0.001	0.001	0.004	0.000	1	1	0	0	346	3236	7799	2036				
PgtSth N	0.000	0.079	0.093	0.269	20	29	13	1	346	3236	7799	2036				
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	18568	14342	8561	2025				
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	346	3236	7799	2036				
Wash Ocn	0.000	0.000	0.000	0.000	29	4	0	0	18568	14342	8561	2025				
PgtNth S	0.001	0.001	0.000	0.095	19	2	0	5	18568	14342	8561	2025				
PgtSth S	0.002	0.005	0.002	0.007	67	12	1	0	18568	14342	8561	2025				
terminal S	0.000	0.000	0.000	0.000	11	0	0	2	346	3236	7799	2036				
Fishery	(3) calculate FP for Chinook Model				(7) 2003 CNR mortality (CCC file)				(10) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0.000	2.121	0.000	0.000	0	0	0	0	0	0	0	0				
PgtNth N	0.031	0.063	0.214	0.000	0	0	0	0	0.131	0.038	0.027	0				
PgtSth N	0.000	0.876	0.486	0.411	0	0	0	0	0.143	0.13	0.205	0.473				
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0				
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0				
Wash Ocn	4.013	2.054	0.000	0.000	0	0	0	0	0.001	0.001	0	0				
PgtNth S	0.452	0.200	0.000	1.523	60	5	0	10	0.008	0.016	0.002	0.054				
PgtSth S	0.804	0.603	0.063	0.101	86	11	1	0	0.007	0.017	0.028	0.029				
terminal S	0.000	0.000	0.000	0.000	0	0	0	0	0.078	0	0	0.021				
(12) sum of AEQ total mortality =				1896.47												
(13) sum of cohort X AEQ BPER =				4676.37												
(14) US ISBM =				0.41												

**TABLE 1.3(B): BASE PERIOD EXPLOITATION RATES FOR SKAGIT FALL IN US FISHERIES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	94	335	361	0	105	214	551	0	64	240	353	0	48	146	395	0
PgtSth N	0	1082	2804	1195	0	692	4283	1056	0	775	2739	1613	0	471	3065	1031
Wash Cst l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	27	0	0	0	17	0	0	0	19	0	0	0	12	0	0
PgtNth S	502	972	25	142	561	621	39	126	342	696	25	192	247	423	28	123
PgtSth S	161	999	439	76	180	638	670	67	110	715	429	103	79	435	480	66
terminal S	0	0	0	49	0	0	0	44	0	0	0	67	0	0	0	43

Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	24	41	10	1	27	26	16	1	20	35	12	1	13	19	12	1
PgtSth N	133	227	57	3	133	130	78	3	97	174	60	5	65	95	60	3
Wash Cst l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	122	19	1	0	133	12	1	0	82	14	1	0	55	8	1	0
PgtNth S	273	143	4	21	315	92	6	18	184	102	4	28	125	62	4	18
PgtSth S	419	149	64	11	519	96	97	10	305	107	62	15	222	65	70	10
terminal S	91	1	0	3	89	0	0	3	46	0	0	5	23	0	0	3

Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
PgtNth N	910	10049	13963	2531	1020	6429	21326	2238	621	7196	13639	3417	465	4373	15260	2185
PgtSth N	910	10049	13963	2531	1020	6429	21326	2238	621	7196	13639	3417	465	4373	15260	2185
Wash Cst l	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
terminal N	910	10049	13963	2531	1020	6429	21326	2238	621	7196	13639	3417	465	4373	15260	2185
Wash Ocn	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
PgtNth S	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
PgtSth S	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
terminal S	910	10049	13963	2531	1020	6429	21326	2238	621	7196	13639	3417	465	4373	15260	2185

Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.129	0.037	0.027	0	0.129	0.037	0.027	0	0.134	0.038	0.027	0	0.13	0.038	0.027	0
PgtSth N	0.146	0.13	0.205	0.473	0.13	0.128	0.204	0.473	0.156	0.132	0.205	0.473	0.14	0.129	0.205	0.473
Wash Cst l	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0
PgtNth S	0.008	0.016	0.002	0.054	0.009	0.016	0.002	0.054	0.008	0.016	0.002	0.054	0.008	0.016	0.002	0.054
PgtSth S	0.006	0.017	0.028	0.029	0.007	0.017	0.028	0.029	0.007	0.017	0.028	0.029	0.007	0.017	0.028	0.029
terminal S	0.099	0	0	0.021	0.087	0	0	0.021	0.073	0	0	0.021	0.05	0	0	0.021



**TABLE 1.3(C): DATA AND COMPUTATION FLOW FOR PRESEASON SKAGIT FALL CANADIAN ISBM INDEX (FIGURE 7)**

TABLE 1.3(C). DATA AND COMPUTATION FLOW FOR REASON SRAGIT FALL CANADIAN ISDM INDEX (FIGURE 7)														
Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate					
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5		
Centr T	2	5		5	0	0.58	0.83	0.98		1	133.4	588.02	382.05	13.09
Geo St T	2	5		3	0	0.58	0.83	0.98		1	135.54	431.93	149.7	0.19
North N	0	14		0	0	0.58	0.83		1	1	12.13	122.68	0	0
Centr N	43	61		1	0	0.58	0.83		1	1	290.47	546.91	9.71	0.12
WCVI N	22	172		6	19	0.58	0.83		1	1	28.15	223.66	9.72	30.13
J De F N	4	3		0	0	0.58	0.83		1	1	81.17	77.5	0	0
John St N	1	1		0	0	0.58	0.83		1	1	129.53	172.71	28.35	59.99
Fraser N	0	0		0	0	0.58	0.83	0.98		1	0	0	0	0
Geo St S	0	413		154	0	0.58	0.83	0.98		1	742.46	1249.51	246.69	0.05
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5						
Centr T	1	1		0	0	18568	14342	8561	2025					
Geo St T	2	1		0	0	18568	14342	8561	2025					
North N	3	0		0	0	18568	14342	7799	2036					
Centr N	4	0		0	0	18568	14342	7799	2036					
WCVI N	8	0		0	0	18568	14342	7799	2036					
J De F N	0	0		0	0	18568	14342	7799	2036					
John St N	0	0		0	0	18568	14342	7799	2036					
Fraser N	0	0		0	0	18568	14342	8561	2025					
Geo St S	137	82		14	0	18568	14342	8561	2025					
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5						
Centr T	94	78		22	1	0.007	0.041	0.045	0.006					
Geo St T	79	63		14	0	0.007	0.03	0.017	0					
North N	25	122		0	0	0.001	0.009	0	0					
Centr N	410	542		8	0	0.016	0.038	0.001	0					
WCVI N	0	0		0	0	0.002	0.016	0.001	0.015					
J De F N	122	82		0	0	0.004	0.005	0	0					
John St N	193	187		25	54	0.007	0.012	0.004	0.029					
Fraser N	0	0		0	0	0	0	0	0					
Geo St S	58	34		6	0	0.04	0.087	0.029	0					
(8) sum of	2572.92													
(9) sum of	5895.54													
(10) Canac	0.44													

**TABLE 1.3(D): SKAGIT FALL BASE PERIOD EXPLOITATION RATES IN US CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	350	2623	793	19	391	1676	1211	17	238	1878	775	26	172	1143	867	16
Geo St T	341	2037	312	0	381	1302	477	0	232	1458	305	0	167	888	341	0
North N	0	586	0	0	0	374	0	0	0	419	0	0	0	255	0	0
Centr N	1318	2623	17	0	1473	1676	26	0	897	1878	16	0	648	1143	18	0
WCVI N	99	1078	17	37	110	689	26	33	67	772	16	50	48	470	18	32
J De F N	367	373	0	0	411	238	0	0	250	267	0	0	181	162	0	0
John St N	574	825	50	74	641	528	77	66	390	591	49	100	282	360	55	64
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	4078	5658	489	0	4560	3616	747	0	2775	4051	478	0	381	2441	535	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	306	218	18	1	320	132	27	1	219	162	18	1	153	96	20	1
Geo St T	366	51	6	0	367	32	9	0	216	35	5	0	144	21	6	0
North N	63	7	0	0	61	4	0	0	42	5	0	0	29	3	0	0
Centr N	129	22	1	0	134	13	1	0	70	13	1	0	45	7	1	0
WCVI N	42	2	0	0	46	1	1	0	28	1	1	0	17	1	1	0
J De F N	33	2	0	0	34	1	0	0	22	1	0	0	15	1	0	0
John St N	76	11	0	0	78	6	1	0	41	6	0	1	24	3	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	285	390	34	0	318	250	52	0	194	279	33	0	364	172	37	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
Geo St T	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
North N	53252	57211	13963	2531	59543	36565	21326	2238	36239	40956	13639	3417	26176	24928	15260	2185
Centr N	53252	57211	13963	2531	59543	36565	21326	2238	36239	40956	13639	3417	26176	24928	15260	2185
WCVI N	53252	57211	13963	2531	59543	36565	21326	2238	36239	40956	13639	3417	26176	24928	15260	2185
J De F N	53252	57211	13963	2531	59543	36565	21326	2238	36239	40956	13639	3417	26176	24928	15260	2185
John St N	53252	57211	13963	2531	59543	36565	21326	2238	36239	40956	13639	3417	26176	24928	15260	2185
Fraser N	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616
Geo St S	53252	57211	17822	3030	59543	36565	27214	2679	36239	40956	17411	4091	26176	24928	19487	2616

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.007	0.041	0.045	0.006	0.007	0.041	0.045	0.006	0.007	0.041	0.045	0.006	0.007	0.041	0.045	0.006
Geo St T	0.008	0.03	0.017	0	0.007	0.03	0.017	0	0.007	0.03	0.017	0	0.007	0.03	0.017	0
North N	0.001	0.009	0	0	0.001	0.009	0	0	0.001	0.009	0	0	0.001	0.009	0	0
Centr N	0.016	0.038	0.001	0	0.016	0.038	0.001	0	0.016	0.038	0.001	0	0.015	0.038	0.001	0
WCVI N	0.002	0.016	0.001	0.015	0.002	0.016	0.001	0.015	0.002	0.016	0.001	0.015	0.001	0.016	0.001	0.015
J De F N	0.004	0.005	0	0	0.004	0.005	0	0	0.004	0.005	0	0	0.004	0.005	0	0
John St N	0.007	0.012	0.004	0.029	0.007	0.012	0.004	0.029	0.007	0.012	0.004	0.029	0.007	0.012	0.004	0.029
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.048	0.087	0.029	0	0.048	0.087	0.029	0	0.048	0.087	0.029	0	0.017	0.087	0.029	0

**TABLE 1.4(A): DATA AND COMPUTATION FLOW OF STILLAGUAMISH US ISBM INDEX (FIGURE 6)**

Fishery	(1) average 1979-1981 (base period) harvest rates (FRAM)				(4) 2003 legal catch (ccc file)				(7) AEQ for all years				(10) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.000	0.003	0.010	0.000		0	0	0	0	0.59	0.84	0.99	1	0	0	0
PgtNth N	0.002	0.010	0.000	0.000		0	1	0	0	1	1	1	1	10.56	49.55	82.42
PgtSth N	0.211	0.105	0.032	0.019		3	39	75	0	1	1	1	1	12.76	174.83	241.33
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0.59	0.84	0.99	1	0	0	0
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	1	1	1	1	0	0	0
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0.59	0.84	0.99	1	0	0	0
PgtNth S	0.004	0.019	0.044	0.093		0	2	0	0	0.59	0.84	0.99	1	6.74	25.83	0
PgtSth S	0.022	0.110	0.063	0.000		0	40	8	0	0.59	0.84	0.99	1	178.21	270.32	58.1
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	1	1	1	1	0	0	0
Fishery	(2) 2003 harvest rates (FRAM)				(5) 2003 shaker mortality (CCC file)				(8) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0.001	0.002	0.028	0.000		0	0	0	0	3085	3443	1571	104			
PgtNth N	0.000	0.001	0.000	0.000		0	0	0	0	58	861	1350	116			
PgtSth N	0.124	0.026	0.010	0.003		3	8	2	0	58	861	1350	116			
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	3085	3443	1571	104			
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	58	861	1350	116			
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	3085	3443	1571	104			
PgtNth S	0.002	0.005	0.011	0.036		3	0	0	0	3085	3443	1571	104			
PgtSth S	0.020	0.038	0.022	0.001		11	6	1	0	3085	3443	1571	104			
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	58	861	1350	116			
Fishery	(3) calculate FP for Chinook Model				(6) 2003 CNR mortality (CCC file)				(9) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	7.181	0.506	2.957	0.000		0	0	0	0	0	0	0	0			
PgtNth N	0.000	0.056	0.000	0.000		0	0	0	0	0.182	0.058	0.061	0			
PgtSth N	0.588	0.249	0.316	0.158		0	0	0	0	0.22	0.203	0.179	0.001			
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0			
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0			
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0			
PgtNth S	0.463	0.246	0.251	0.386		10	1	0	0	0.002	0.008	0	0			
PgtSth S	0.888	0.344	0.356	0.000		15	6	1	0	0.058	0.079	0.037	0.274			
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0			
(11) sum of AEQ total mortality =				209.73												
(12) sum of cohort X AEQ BPER =				1139.48												
(13) US ISBM =				0.18												

**TABLE 1.4(B): STILLAGUAMISH BASE PERIOD EXPLOITATION RATES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	7	21	48	0	7	17	42	0	5	17	33	0	4	12	33	0
PgtSth N	3	72	141	0	3	57	122	0	2	57	97	0	2	40	96	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0	17	0	0	0	14	0	0	0	14	0	0	0	10	0	0
PgtSth S	205	181	34	21	204	144	30	19	141	144	24	17	122	100	24	13
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	1	2	1	0	1	1	1	0	1	2	0	0	1	1	0	0
PgtSth N	7	9	3	0	6	6	3	0	5	8	2	0	4	5	2	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	10	3	0	0	10	2	0	0	7	2	0	0	5	1	0	0
PgtSth S	49	26	5	3	51	21	4	3	35	21	3	2	30	15	3	2
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
PgtNth N	45	397	805	72	45	317	696	68	31	316	555	59	27	218	552	47
PgtSth N	45	397	805	72	45	317	696	68	31	316	555	59	27	218	552	47
Wash Cst I	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
terminal N	45	397	805	72	45	317	696	68	31	316	555	59	27	218	552	47
Wash Ocn	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
PgtNth S	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
PgtSth S	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
terminal S	45	397	805	72	45	317	696	68	31	316	555	59	27	218	552	47

Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.18	0.057	0.061	0	0.18	0.057	0.061	0	0.186	0.058	0.061	0	0.182	0.057	0.061	0
PgtSth N	0.222	0.203	0.179	0.001	0.207	0.201	0.178	0.001	0.233	0.205	0.179	0.001	0.216	0.202	0.179	0.001
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0.002	0.008	0	0	0.002	0.008	0	0	0.002	0.008	0	0	0.002	0.008	0	0
PgtSth S	0.057	0.079	0.037	0.275	0.058	0.079	0.037	0.274	0.058	0.079	0.037	0.274	0.058	0.079	0.037	0.275
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 1.4(C): DATA AND COMPUTATION FLOW OF STILLAGUAMISH PRESEASON CANADIAN ISBM INDEX (FIGURE 6)

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate				
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	
Centr T	0	3	0	0	0	0.59	0.84	0.99	1	10.29	282.88	0.38	0.01
Geo St T	0	0	0	0	0	0.59	0.84	0.99	1	0	0	0	0
North N	6	15	0	0	0	0.59	0.84	1	1	39.68	129.51	0	0
Centr N	6	1	0	0	0	0.59	0.84	1	1	41.43	12.2	0	0
WCVI N	46	72	0	0	0	0.59	0.84	1	1	44.02	95.57	0	0
J De F N	0	0	0	0	0	0.59	0.84	1	1	8.62	0.08	0	0
John St N	0	0	0	0	0	0.59	0.84	1	1	19.73	45.37	0	0
Fraser N	0	0	0	0	0	0.59	0.84	0.99	1	0	0	0	0
Geo St S	0	84	129	0	0	0.59	0.84	0.99	1	57.31	257.63	209.23	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
Centr T	0	0	0	0	3085	3443	1571	104					
Geo St T	0	0	0	0	3085	3443	1571	104					
North N	0	0	0	0	3085	3443	1350	116					
Centr N	1	0	0	0	3085	3443	1350	116					
WCVI N	1	0	0	0	3085	3443	1350	116					
J De F N	0	0	0	0	3085	3443	1350	116					
John St N	0	0	0	0	3085	3443	1350	116					
Fraser N	0	0	0	0	3085	3443	1571	104					
Geo St S	23	19	10	0	3085	3443	1571	104					
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
Centr T	15	23	1	0	0.003	0.082	0	0					
Geo St T	0	0	0	0	0	0	0	0					
North N	56	126	0	0	0.013	0.038	0	0					
Centr N	58	12	0	0	0.013	0.004	0	0					
WCVI N	0	0	0	0	0.014	0.028	0	0					
J De F N	13	0	0	0	0.003	0	0	0					
John St N	29	48	0	0	0.006	0.013	0	0					
Fraser N	0	0	0	0	0	0	0	0					
Geo St S	10	8	4	0	0.019	0.075	0.133	0					
(8) sum of	643.05												
(9) sum of	1253.94												
(10) Canac	0.51												

**TABLE 1.4(D): STILLAGUAMISH BASE PERIOD EXPLOITATION RATES FOR CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	207	0	0	0	165	0	0	0	164	0	0	0	114	0	0
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	54	99	0	0	54	79	0	0	37	79	0	0	32	55	0	0
Centr N	54	9	0	0	54	7	0	0	37	7	0	0	32	5	0	0
WCVI N	61	73	0	0	61	58	0	0	42	58	0	0	36	40	0	0
J De F N	11	0	0	0	11	0	0	0	7	0	0	0	6	0	0	0
John St N	25	34	0	0	25	27	0	0	17	27	0	0	15	19	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	86	185	132	0	86	148	114	0	60	147	91	0	10	101	91	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	15	10	0	0	14	8	0	0	11	8	0	0	9	6	0	0
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	3	0	0	0	3	0	0	0	2	0	0	0	2	0	0	0
Centr N	6	1	0	0	6	1	0	0	3	1	0	0	3	0	0	0
WCVI N	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	0
J De F N	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0
John St N	4	0	0	0	3	0	0	0	2	0	0	0	1	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	13	9	0	6	10	8	0	4	10	6	0	21	7	6	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
Geo St T	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
North N	2610	2208	805	72	2602	1761	696	68	1803	1758	555	59	1559	1218	552	47
Centr N	2610	2208	805	72	2602	1761	696	68	1803	1758	555	59	1559	1218	552	47
WCVI N	2610	2208	805	72	2602	1761	696	68	1803	1758	555	59	1559	1218	552	47
J De F N	2610	2208	805	72	2602	1761	696	68	1803	1758	555	59	1559	1218	552	47
John St N	2610	2208	805	72	2602	1761	696	68	1803	1758	555	59	1559	1218	552	47
Fraser N	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56
Geo St S	2610	2208	1046	86	2602	1761	905	81	1803	1758	723	70	1559	1218	721	56

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.082	0	0	0.003	0.082	0	0	0.004	0.082	0	0	0.003	0.082	0	0
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.013	0.038	0	0	0.013	0.038	0	0	0.013	0.038	0	0	0.013	0.038	0	0
Centr N	0.014	0.004	0	0	0.014	0.004	0	0	0.013	0.004	0	0	0.013	0.003	0	0
WCVI N	0.014	0.028	0	0	0.014	0.028	0	0	0.014	0.028	0	0	0.014	0.028	0	0
J De F N	0.003	0	0	0	0.003	0	0	0	0.003	0	0	0	0.003	0	0	0
John St N	0.007	0.013	0	0	0.006	0.013	0	0	0.006	0.013	0	0	0.006	0.013	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.021	0.075	0.133	0	0.021	0.075	0.133	0	0.021	0.075	0.133	0	0.012	0.074	0.133	0

**TABLE 1.5(A): DATA AND COMPUTATION FLOW FOR PRESEASON SNOHOMISH US ISBM FISHERIES (FIGURE 6)**

Fishery	(1) average 1979-1981 (base period) harvest rates (FRAM)				(4) 2003 legal catch (ccc file)				(7) AEQ for all years				(10) cohort X base period exploitation rate				
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	
WA/OR T	0.000	0.003	0.008	0.000		0	0	0	0	0.57	0.81	0.97	1		0	0	0
PgtNth N	0.002	0.008	0.000	0.000		0	2	0	0	1	1	1	1		18.78	61.08	105.91
PgtSth N	0.231	0.239	0.420	0.000		0	51	126	0	1	1	1	1		12.71	534.08	2270.33
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0.57	0.81	0.97	1		0	0	0
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	1	1	1	1		0	0	0
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0.57	0.81	0.97	1		10.84	4.75	0.22
PgtNth S	0.003	0.018	0.041	0.093		0	7	0	3	0.57	0.81	0.97	1		70.39	116.27	7.06
PgtSth S	0.021	0.105	0.060	0.000		0	18	16	0	0.57	0.81	0.97	1		55.48	119.71	122
terminal S	0.000	0.000	0.000	0.000		0	0	0	12	1	1	1	1		12.35	0.12	0
Fishery	(2) 2003 harvest rates (FRAM)				(5) 2003 shaker mortality (CCC file)				(8) 2003 cohort (CCC file)								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	0.001	0.002	0.027	0.000		0	0	0	0	8536	7428	4758	1211				
PgtNth N	0.000	0.001	0.000	0.000		0	0	0	0	89	1303	3964	1280				
PgtSth N	0.120	0.024	0.024	0.000		5	12	6	1	89	1303	3964	1280				
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	8536	7428	4758	1211				
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	89	1303	3964	1280				
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	8536	7428	4758	1211				
PgtNth S	0.002	0.005	0.010	0.030		9	1	0	0	8536	7428	4758	1211				
PgtSth S	0.010	0.036	0.020	1.036		31	4	2	0	8536	7428	4758	1211				
terminal S	0.000	0.000	0.000	0.000		5	0	0	1	89	1303	3964	1280				
Fishery	(3) calculate FP for Chinook Model				(6) 2003 CNR mortality (CCC file)				(9) base period exploitation rates								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	3.868	0.472	3.311	0.000		0	0	0	0	0	0	0	0				
PgtNth N	0.000	0.128	0.000	0.000		0	0	0	0	0.211	0.047	0.027	0				
PgtSth N	0.517	0.100	0.056	0.000		0	0	0	0	0.143	0.41	0.573	0.817				
Wash Cst I	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0				
terminal N	0.000	0.000	0.000	0.000		0	0	0	0	0	0	0	0				
Wash Ocn	0.000	0.000	0.000	0.000		0	0	0	0	0.001	0.001	0	0				
PgtNth S	0.439	0.255	0.255	0.323		28	3	0	1	0.008	0.016	0.001	0.036				
PgtSth S	0.469	0.343	0.328	0.000		40	4	2	0	0.006	0.016	0.026	0.019				
terminal S	0.000	0.000	0.000	0.000		0	0	0	0	0.139	0	0	0.011				
(11) sum of AEQ total mortality =				337.01													
(12) sum of cohort X AEQ BPER =				4649.93													
(13) US ISBM =				0.07													

**TABLE 1.5(B): SNOHOMISH BASE PERIOD EXPLOITATION RATES FOR US FISHERIES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	48	150	232	0	41	111	247	0	43	94	182	0	38	99	154	0
PgtSth N	0	1365	5091	1871	0	1010	5409	1936	0	856	4000	2057	0	904	3387	1532
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	12	0	0	0	9	0	0	0	7	0	0	0	8	0	0
PgtNth S	260	435	16	78	220	321	17	81	230	272	13	86	194	286	11	64
PgtSth S	83	446	282	42	71	330	300	43	74	280	222	46	62	293	188	34
terminal S	0	0	0	25	0	0	0	26	0	0	0	27	0	0	0	20

Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	7	14	7	1	6	11	7	1	7	11	6	1	6	10	5	0
PgtSth N	38	79	37	3	29	53	35	3	37	53	31	4	29	50	23	2
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	63	9	1	0	52	6	1	0	56	5	0	0	43	5	0	0
PgtNth S	142	64	2	11	124	47	3	12	125	40	2	13	98	42	2	9
PgtSth S	217	67	41	6	204	49	44	6	207	42	32	7	175	44	27	5
terminal S	47	0	0	2	35	0	0	2	31	0	0	2	18	0	0	1

Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
PgtNth N	264	3520	8951	2294	224	2605	9510	2374	235	2207	7034	2522	205	2329	5955	1878
PgtSth N	264	3520	8951	2294	224	2605	9510	2374	235	2207	7034	2522	205	2329	5955	1878
Wash Cst I	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
terminal N	264	3520	8951	2294	224	2605	9510	2374	235	2207	7034	2522	205	2329	5955	1878
Wash Ocn	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
PgtNth S	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
PgtSth S	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
terminal S	264	3520	8951	2294	224	2605	9510	2374	235	2207	7034	2522	205	2329	5955	1878

Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.21	0.047	0.027	0	0.21	0.047	0.027	0	0.215	0.047	0.027	0	0.211	0.047	0.027	0
PgtSth N	0.146	0.41	0.573	0.817	0.13	0.408	0.572	0.817	0.156	0.412	0.573	0.817	0.14	0.41	0.573	0.817
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0
PgtNth S	0.008	0.016	0.001	0.036	0.008	0.016	0.001	0.036	0.008	0.016	0.001	0.036	0.008	0.016	0.001	0.036
PgtSth S	0.006	0.016	0.026	0.019	0.007	0.016	0.026	0.019	0.007	0.016	0.026	0.019	0.007	0.016	0.026	0.019
terminal S	0.178	0	0	0.011	0.157	0	0	0.011	0.131	0	0	0.011	0.09	0	0	0.011



**TABLE 1.5(C): DATA AND COMPUTATION FLOW FOR SNOHOMISH FOR CANADIAN ISBM INDEX (FIGURE 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	3	2	0	0.57	0.81	0.97	1	59.91	296.37	196.93	5.29
Geo St T	1	2	2	0	0.57	0.81	0.97	1	60.87	217.57	77.14	0.11
North N	0	7	0	0	0.57	0.81	1	1	5.46	61.8	0	0
Centr N	20	31	0	0	0.57	0.81	1	1	130.21	275.49	4.95	0.08
WCVI N	10	88	3	7	0.57	0.81	1	1	12.63	112.66	4.95	11.68
J De F N	2	1	0	0	0.57	0.81	1	1	36.39	39.04	0	0
John St N	0	1	0	0	0.57	0.81	1	1	58.07	87	14.45	23.19
Fraser N	0	0	0	0	0.57	0.81	0.97	1	0	0	0	0
Geo St S	0	211	80	0	0.57	0.81	0.97	1	332.78	629.36	127.12	0.03

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	0	0	0	8536	7428	4758	1211
Geo St T	1	1	0	0	8536	7428	4758	1211
North N	1	0	0	0	8536	7428	3964	1280
Centr N	2	0	0	0	8536	7428	3964	1280
WCVI N	4	0	0	0	8536	7428	3964	1280
J De F N	0	0	0	0	8536	7428	3964	1280
John St N	0	0	0	0	8536	7428	3964	1280
Fraser N	0	0	0	0	8536	7428	4758	1211
Geo St S	63	42	7	0	8536	7428	4758	1211

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	43	41	11	0	0.007	0.04	0.041	0.004
Geo St T	36	33	7	0	0.007	0.029	0.016	0
North N	11	62	0	0	0.001	0.008	0	0
Centr N	187	278	4	0	0.015	0.037	0.001	0
WCVI N	0	0	0	0	0.001	0.015	0.001	0.009
J De F N	56	42	0	0	0.004	0.005	0	0
John St N	88	96	13	21	0.007	0.012	0.004	0.018
Fraser N	0	0	0	0	0	0	0	0
Geo St S	27	18	3	0	0.039	0.085	0.027	0

(8) sum of AEQ total mortality =	1252.94
(9) sum of cohort X AEQ BPER =	2881.51
(10) Canada ISBM =	0.43

**TABLE 1.5(D): BASE PERIOD DATA FOR SNOHOMISH FOR CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	181	1173	510	10	153	867	542	11	160	735	401	11	135	771	340	8
Geo St T	176	911	201	0	149	673	213	0	156	571	158	0	132	599	134	0
North N	0	262	0	0	0	194	0	0	0	164	0	0	0	172	0	0
Centr N	681	1173	11	0	577	867	11	0	605	735	8	0	509	771	7	0
WCVI N	51	482	11	21	43	356	11	21	45	302	8	23	38	317	7	17
J De F N	190	167	0	0	161	123	0	0	169	104	0	0	142	110	0	0
John St N	297	369	32	41	251	273	34	43	263	231	25	45	221	243	22	34
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	2109	2530	315	0	1785	1870	334	0	1872	1586	247	0	300	1647	209	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	159	98	12	0	126	69	12	0	148	64	9	0	121	65	8	0
Geo St T	190	23	4	0	144	16	4	0	146	14	3	0	114	14	2	0
North N	33	3	0	0	24	2	0	0	29	2	0	0	23	2	0	0
Centr N	67	10	0	0	53	7	0	0	47	5	0	0	36	5	0	0
WCVI N	22	1	0	0	18	1	0	0	19	1	0	0	14	1	0	0
J De F N	17	1	0	0	13	1	0	0	15	0	0	0	12	0	0	0
John St N	39	5	0	0	31	3	0	0	28	2	0	1	19	2	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	147	175	22	0	125	129	23	0	131	109	17	0	287	116	15	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
Geo St T	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
North N	27662	25852	8951	2294	23416	19107	9510	2374	24556	16202	7034	2522	20656	16993	5955	1878
Centr N	27662	25852	8951	2294	23416	19107	9510	2374	24556	16202	7034	2522	20656	16993	5955	1878
WCVI N	27662	25852	8951	2294	23416	19107	9510	2374	24556	16202	7034	2522	20656	16993	5955	1878
J De F N	27662	25852	8951	2294	23416	19107	9510	2374	24556	16202	7034	2522	20656	16993	5955	1878
John St N	27662	25852	8951	2294	23416	19107	9510	2374	24556	16202	7034	2522	20656	16993	5955	1878
Fraser N	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014
Geo St S	27662	25852	12269	2476	23416	19107	13033	2563	24556	16202	9643	2723	20656	16993	8170	2014

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.007	0.04	0.041	0.004	0.007	0.04	0.041	0.004	0.007	0.04	0.041	0.004	0.007	0.04	0.041	0.004
Geo St T	0.008	0.029	0.016	0	0.007	0.029	0.016	0	0.007	0.029	0.016	0	0.007	0.029	0.016	0
North N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
Centr N	0.015	0.037	0.001	0	0.015	0.037	0.001	0	0.015	0.037	0.001	0	0.015	0.037	0.001	0
WCVI N	0.002	0.015	0.001	0.009	0.001	0.015	0.001	0.009	0.001	0.015	0.001	0.009	0.001	0.015	0.001	0.009
J De F N	0.004	0.005	0	0	0.004	0.005	0	0	0.004	0.005	0	0	0.004	0.005	0	0
John St N	0.007	0.012	0.004	0.018	0.007	0.012	0.004	0.018	0.007	0.012	0.004	0.018	0.007	0.012	0.004	0.018
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.047	0.085	0.027	0	0.047	0.085	0.027	0	0.047	0.085	0.027	0	0.016	0.084	0.027	0

**TABLE 1.6 (A): DATA AND COMPUTATION FLOW FOR LAKE WASHINGTON FALL US ISBM INDEX (FIGURE 6)**

Fishery	(1) average 1979-1981 (base period) harvest rates (FRAM)				(4) 2003 legal catch (ccc file)				(7) AEQ for all years				(10) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.001	0.017	0.019	0.077	0	1008	3279	0	0.58	0.82	0.98	1	218.06	583.81	919.21	61.83
PgtNth N	0.027	0.017	0.011	0.000	1	48	133	0	1	1	1	1	77.17	1776.71	1024.47	53.07
PgtSth N	0.082	0.124	0.180	0.170	113	3391	8282	2786	1	1	1	1	724.97	2993.43	6288.82	1259.88
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0.58	0.82	0.98	1	0	0	0	0
terminal N					0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn	0.000	0.002	0.000	0.000	0	99	36	0	0.58	0.82	0.98	1	46.91	103.47	41.73	0.04
PgtNth S	0.003	0.020	0.074	0.038	0	146	135	0	0.58	0.82	0.98	1	172.89	1237.44	1670.27	210.35
PgtSth S	0.049	0.213	0.123	0.308	0	1046	549	17	0.58	0.82	0.98	1	1741.54	5191.28	2079.24	210.45
terminal S	0.000	0.000	0.000	0.000	0	0	31	0	1	1	1	1	52.3	0.67	42.61	0
Fishery	(2) 2003 harvest rates (FRAM)				(5) 2003 shaker mortality (CCC file)				(8) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0.001	0.033	0.050	0.000	306	302	120	2	36494	45171	24636	2777				
PgtNth N	0.003	0.002	0.006	0.000	2	2	1	0	964	8004	18999	2816				
PgtSth N	0.016	0.150	0.240	0.377	59	76	33	2	964	8004	18999	2816				
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	36494	45171	24636	2777				
terminal N					0	0	0	0	964	8004	18999	2816				
Wash Ocn	0.000	0.003	0.000	0.000	56	16	3	0	36494	45171	24636	2777				
PgtNth S	0.001	0.009	0.026	0.000	37	23	20	0	36494	45171	24636	2777				
PgtSth S	0.035	0.086	0.075	0.059	134	160	80	3	36494	45171	24636	2777				
terminal S	0.000	0.000	0.000	0.000	21	0	2	0	964	8004	18999	2816				
Fishery	(3) calculate FP for Chinook Model				(6) 2003 CNR mortality (CCC file)				(9) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0.872	1.968	2.689	0.000	0	0	0	0	0.006	0.013	0.037	0.022				
PgtNth N	0.108	0.116	0.556	0.000	0	0	0	0	0.08	0.222	0.054	0.019				
PgtSth N	0.192	1.204	1.333	2.219	0	0	0	0	0.752	0.374	0.331	0.447				
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0				
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0				
Wash Ocn	0.000	1.462	0.000	0.000	0	0	0	0	0.001	0.002	0.002	0				
PgtNth S	0.530	0.454	0.357	0.000	110	46	36	0	0.005	0.027	0.068	0.076				
PgtSth S	0.697	0.405	0.609	0.191	149	111	54	2	0.048	0.115	0.084	0.076				
terminal S	0.000	0.000	0.000	0.000	0	0	0	0	0.054	0	0.002	0				
(11) sum of AEQ total mortality = 22102.76																
(12) sum of cohort X AEQ BPER = 28782.62																
(13) US ISBM = 0.77																

**TABLE 1.6 (B): BASE PERIOD DATA FOR LAKE WASHINGTON FALL IN US FISHERIES (FIGURE 6)**

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	367	1059	78	0	236	888	74	0	228	571	62	0	417	553	40
PgtNth N	52	1414	964	49	51	909	809	46	93	881	520	39	94	1606	503	25
PgtSth N	612	2286	5931	1165	594	1470	4977	1103	1085	1424	3199	926	1101	2597	3097	595
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	106	47	0	0	68	39	0	0	66	25	0	0	121	24	0
PgtNth S	161	1322	1799	245	155	848	1509	232	284	822	970	194	288	1502	939	125
PgtSth S	2668	5551	2240	245	2577	3560	1878	232	4712	3450	1207	194	4783	6306	1169	125
terminal S	0	0	38	0	0	0	32	0	0	0	21	0	0	0	20	0
Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	488	401	84	5	385	210	60	4	720	208	39	3	714	372	37	2
PgtNth N	27	27	13	1	26	17	11	1	56	20	9	1	50	32	7	0
PgtSth N	146	147	74	4	127	84	56	3	278	98	43	3	252	160	37	2
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	94	21	5	0	88	13	4	0	164	13	3	0	154	23	2	0
PgtNth S	177	194	261	36	177	124	219	34	310	120	141	28	291	220	136	18
PgtSth S	691	808	325	36	701	519	273	34	1260	503	175	28	1282	919	170	18
terminal S	70	1	3	0	59	0	2	0	91	0	1	0	65	0	1	0
Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtNth N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
PgtSth N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Wash Cst I	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
terminal N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Wash Ocn	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtNth S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtSth S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
terminal S	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.014	0.038	0.022	0.006	0.013	0.037	0.022	0.006	0.013	0.037	0.022	0.006	0.013	0.037	0.022
PgtNth N	0.079	0.222	0.054	0.019	0.078	0.222	0.054	0.019	0.084	0.223	0.054	0.019	0.08	0.222	0.054	0.019
PgtSth N	0.755	0.374	0.331	0.447	0.74	0.372	0.331	0.447	0.765	0.376	0.331	0.448	0.749	0.374	0.331	0.447
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0.001	0.002	0.002	0	0.001	0.002	0.002	0	0.001	0.002	0.002	0	0.001	0.002	0.002	0
PgtNth S	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076
PgtSth S	0.047	0.115	0.084	0.076	0.048	0.115	0.084	0.076	0.048	0.115	0.084	0.076	0.048	0.115	0.084	0.076
terminal S	0.069	0	0.002	0	0.061	0	0.002	0	0.051	0	0.002	0	0.036	0	0.002	0

TABLE 1.6 (C) : DATA AND COMPUTATION FLOW FOR LAKE WASHINGTON FALLS IN CANADIAN FISHERIES (FIGURE 7)

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	5	0	0.58	0.82	0.98	1	119.04	192.73	415.38	0.24
Geo St T	0	3	11	0	0.58	0.82	0.98	1	129.72	307.74	541.19	0.26
North N	0	10	0	0	0.58	0.82	1	1	23.63	91	0	0
Centr N	7	8	1	0	0.58	0.82	1	1	86.81	85.57	10.52	0.17
WCVI N	57	384	12	0	0.58	0.82	1	1	67.24	494.39	20.23	0.45
J De F N	6	4	2	1	0.58	0.82	1	1	144.05	114.3	58.38	21.01
John St N	0	1	0	0	0.58	0.82	1	1	62.27	152.28	49.04	0.54
Fraser N	0	0	0	0	0.58	0.82	0.98	1	0	0	0	0
Geo St S	0	811	406	15	0.58	0.82	0.98	1	354.18	2424.35	650.36	23.57

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	2	3	0	0	36494	45171	24636	2777
Geo St T	3	3	0	0	36494	45171	24636	2777
North N	5	1	0	0	36494	45171	18999	2816
Centr N	7	1	0	0	36494	45171	18999	2816
WCVI N	16	1	1	0	36494	45171	18999	2816
J De F N	1	0	0	0	36494	45171	18999	2816
John St N	0	0	0	0	36494	45171	18999	2816
Fraser N	0	0	0	0	36494	45171	24636	2777
Geo St S	270	224	38	1	36494	45171	24636	2777

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	173	193	34	0	0.003	0.004	0.017	0
Geo St T	142	159	47	0	0.004	0.007	0.022	0
North N	49	93	0	0	0.001	0.002	0	0
Centr N	128	87	9	0	0.002	0.002	0.001	0
WCVI N	0	0	0	0	0.002	0.011	0.001	0
J De F N	219	123	51	18	0.004	0.003	0.003	0.007
John St N	85	165	44	1	0.002	0.003	0.003	0
Fraser N	0	0	0	0	0	0	0	0
Geo St S	112	93	15	1	0.01	0.054	0.026	0.008

(8) sum of	3375.99
(9) sum of	6640.64
(10) Canac	0.51

TABLE 1.6 (D): BASE PERIOD DATA FOR LAKE WASHINGTON FALL IN CANADIAN FISHERIES (FIGURE 7)

Fishery	(11) 1979 legal catch (ccc file)					1980 legal catch (ccc file)					1981 legal catch (ccc file)					1982 legal catch (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	0	98	497	0		0	63	416	0		0	61	268	0		0	111	259	0	
Geo St T	6	359	656	0		5	230	550	0		10	223	354	0		10	408	342	0	
North N	0	106	0	0		0	68	0	0		0	66	0	0		0	121	0	0	
Centr N	83	90	9	0		80	58	8	0		147	56	5	0		149	102	5	0	
WCVI N	100	604	19	0		96	387	16	0		176	375	10	0		179	686	10	0	
J De F N	255	139	56	19		246	89	47	18		451	86	30	15		457	158	29	10	
John St N	72	180	46	0		70	115	39	0		127	112	25	0		129	204	24	0	
Fraser N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
Geo St S	649	2784	750	29		627	1785	629	28		1146	1730	404	23		221	3131	391	15	
Fishery	(12) 1979 shakers (ccc file)					1980 shakers (ccc file)					1981 shakers (ccc file)					1982 shakers (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	231	138	16	0		208	83	13	0		428	90	9	0		422	160	8	0	
Geo St T	277	19	12	0		239	11	10	0		423	11	6	0		396	19	6	0	
North N	48	6	0	0		40	3	0	0		84	3	0	0		81	6	0	0	
Centr N	99	18	1	0		89	10	1	0		139	9	0	0		126	14	0	0	
WCVI N	32	2	1	0		31	1	1	0		55	1	0	0		49	2	1	0	
J De F N	25	1	0	0		23	1	0	0		43	1	0	0		43	1	0	0	
John St N	58	8	0	1		52	5	0	0		82	4	0	0		66	6	0	0	
Fraser N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
Geo St S	48	192	53	2		46	123	44	2		83	119	28	2		962	223	27	1	
Fishery	(13) 1979 cohort (ccc file)					1980 cohort (ccc file)					1981 cohort (ccc file)					1982 cohort (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	40924	45116	29803	3701		39535	28931	24988	3503		72276	28040	16066	2939		73361	51254	15558	1889	
Geo St T	40924	45116	29803	3701		39535	28931	24988	3503		72276	28040	16066	2939		73361	51254	15558	1889	
North N	40924	45116	18137	2613		39535	28931	15219	2474		72276	28040	9782	2075		73361	51254	9469	1334	
Centr N	40924	45116	18137	2613		39535	28931	15219	2474		72276	28040	9782	2075		73361	51254	9469	1334	
WCVI N	40924	45116	18137	2613		39535	28931	15219	2474		72276	28040	9782	2075		73361	51254	9469	1334	
J De F N	40924	45116	18137	2613		39535	28931	15219	2474		72276	28040	9782	2075		73361	51254	9469	1334	
John St N	40924	45116	18137	2613		39535	28931	15219	2474		72276	28040	9782	2075		73361	51254	9469	1334	
Fraser N	40924	45116	29803	3701		39535	28931	24988	3503		72276	28040	16066	2939		73361	51254	15558	1889	
Geo St S	40924	45116	29803	3701		39535	28931	24988	3503		72276	28040	16066	2939		73361	51254	15558	1889	
Fishery	(14) 1979 exploitation rate					1980 exploitation rate					1981 exploitation rate					1982 exploitation rate				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	0.003	0.004	0.017	0		0.003	0.004	0.017	0		0.003	0.004	0.017	0		0.003	0.004	0.017	0	
Geo St T	0.004	0.007	0.022	0		0.004	0.007	0.022	0		0.003	0.007	0.022	0		0.003	0.007	0.022	0	
North N	0.001	0.002	0	0		0.001	0.002	0	0		0.001	0.002	0	0		0.001	0.002	0	0	
Centr N	0.003	0.002	0.001	0		0.002	0.002	0.001	0		0.002	0.002	0.001	0		0.002	0.002	0.001	0	
WCVI N	0.002	0.011	0.001	0		0.002	0.011	0.001	0		0.002	0.011	0.001	0		0.002	0.011	0.001	0	
J De F N	0.004	0.003	0.003	0.007		0.004	0.003	0.003	0.007		0.004	0.003	0.003	0.007		0.004	0.003	0.003	0.007	
John St N	0.002	0.003	0.003	0		0.002	0.003	0.003	0		0.002	0.003	0.003	0		0.002	0.003	0.003	0	
Fraser N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
Geo St S	0.01	0.054	0.026	0.008		0.01	0.054	0.026	0.008		0.01	0.054	0.026	0.008		0.009	0.053	0.026	0.009	

TABLE 1.7(A): DATA AND COMPUTATION FLOW FOR GREEN RIVER US INDEX (FIGURE 6)

(1) average 1979-1981 (base period)																		
Fishery	harvest rates (FRAM)				(4) 2003 legal catch (ccc file)					(7) AEQ for all years					(10) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5		
WA/OR T	0.002	0.024	0.024	0.033	0	220	1440	20	0.58	0.82	0.98	1	214.07	583.81	946.25	69.72		
PgtNth N	0.000	0.128	0.007	0.074	0	51	0	1	1	1	1	1	75.76	1800.32	1140.02	59.29		
PgtSth N	0.210	0.319	0.153	0.293	120	645	1929	195	1	1	1	1	711.77	3033.2	6998.08	1407.63		
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0.58	0.82	0.98	1	0	0	0	0		
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	1	1	1	1	0	0	0	0		
Wash Ocn	0.000	0.000	0.001	0.000	0	433	166	0	0.58	0.82	0.98	1	46.05	103.47	42.96	0.04		
PgtNth S	0.001	0.001	0.089	0.137	0	106	102	23	0.58	0.82	0.98	1	169.73	1237.44	1719.41	237.22		
PgtSth S	0.022	0.115	0.078	0.000	0	855	514	0	0.58	0.82	0.98	1	1709.7	5191.28	2140.42	237.33		
terminal S	0.000	0.000	0.000	0.000	0	0	32	0	1	1	1	1	51.35	0.68	47.42	0		
Fishery	(2) 2003 harvest rates (FRAM)				(5) 2003 shaker mortality (CCC file)				(8) 2003 cohort (CCC file)									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5						
WA/OR T	0.004	0.010	0.027	0.007	300	283	75	2	35827	45171	25361	3131						
PgtNth N	0.000	0.015	0.000	0.005	2	2	1	0	946	8110	21142	3146						
PgtSth N	0.044	0.072	0.043	0.041	50	67	32	2	946	8110	21142	3146						
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	35827	45171	25361	3131						
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	946	8110	21142	3146						
Wash Ocn	0.000	0.000	0.006	0.000	55	39	12	0	35827	45171	25361	3131						
PgtNth S	0.001	0.000	0.023	0.060	37	18	15	3	35827	45171	25361	3131						
PgtSth S	0.010	0.037	0.042	0.000	132	132	75	0	35827	45171	25361	3131						
terminal S	0.000	0.000	0.000	0.000	21	0	2	0	946	8110	21142	3146						
Fishery	(3) calculate FP for Chinook Model				(6) 2003 CNR mortality (CCC file)				(9) base period exploitation rates									
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5						
WA/OR T	1.826	0.422	1.128	0.215	0	0	0	0	0.006	0.013	0.037	0.022						
PgtNth N	0.000	0.120	0.000	0.070	0	0	0	0	0.08	0.222	0.054	0.019						
PgtSth N	0.208	0.226	0.279	0.140	0	0	0	0	0.752	0.374	0.331	0.447						
Wash Cst I	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0						
terminal N	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	0						
Wash Ocn	2.715	4.404	4.507	0.000	0	0	0	0	0.001	0.002	0.002	0						
PgtNth S	0.534	0.329	0.261	0.434	107	35	27	6	0.005	0.027	0.068	0.076						
PgtSth S	0.459	0.327	0.547	0.000	143	90	49	0	0.048	0.115	0.084	0.076						
terminal S	0.000	0.000	0.000	0.000	0	0	0	0	0.054	0	0.002	0						
(11) sum of AEQ total mortality =				7885.6														
(12) sum of cohort X AEQ BPER =				29974.42														
(13) US ISBM =				0.26														

TABLE 1.7(B): GREEN RIVER BASE PERIOD EXPLOITATION RATES (FIGURE 6)

Fishery	(14) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	367	1059	78	0	236	888	74	0	228	571	62	0	417	553	40
PgtNth N	52	1414	964	49	51	909	809	46	93	881	520	39	94	1606	503	25
PgtSth N	612	2286	5931	1165	594	1470	4977	1103	1085	1424	3199	926	1101	2597	3097	595
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	106	47	0	0	68	39	0	0	66	25	0	0	121	24	0
PgtNth S	161	1322	1799	245	155	848	1509	232	284	822	970	194	288	1502	939	125
PgtSth S	2668	5551	2240	245	2577	3560	1878	232	4712	3450	1207	194	4783	6306	1169	125
terminal S	0	0	38	0	0	0	32	0	0	0	21	0	0	0	20	0
Fishery	(15) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	488	401	84	5	385	210	60	4	720	208	39	3	714	372	37	2
PgtNth N	27	27	13	1	26	17	11	1	56	20	9	1	50	32	7	0
PgtSth N	146	147	74	4	127	84	56	3	278	98	43	3	252	160	37	2
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	94	21	5	0	88	13	4	0	164	13	3	0	154	23	2	0
PgtNth S	177	194	261	36	177	124	219	34	310	120	141	28	291	220	136	18
PgtSth S	691	808	325	36	701	519	273	34	1260	503	175	28	1282	919	170	18
terminal S	70	1	3	0	59	0	2	0	91	0	1	0	65	0	1	0
Fishery	(16) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtNth N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
PgtSth N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Wash Cst N	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
terminal N	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Wash Ocn S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtNth S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
PgtSth S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
terminal S	1005	6498	18137	2613	974	4178	15219	2474	1781	4046	9782	2075	1807	7380	9469	1334
Fishery	(17) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.014	0.038	0.022	0.006	0.013	0.037	0.022	0.006	0.013	0.037	0.022	0.006	0.013	0.037	0.022
PgtNth N	0.079	0.222	0.054	0.019	0.078	0.222	0.054	0.019	0.084	0.223	0.054	0.019	0.08	0.222	0.054	0.019
PgtSth N	0.755	0.374	0.331	0.447	0.74	0.372	0.331	0.447	0.765	0.376	0.331	0.448	0.749	0.374	0.331	0.447
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0.002	0.002	0	0.001	0.002	0.002	0	0.001	0.002	0.002	0	0.001	0.002	0.002	0
PgtNth S	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076	0.005	0.027	0.068	0.076
PgtSth S	0.047	0.115	0.084	0.076	0.048	0.115	0.084	0.076	0.048	0.115	0.084	0.076	0.048	0.115	0.084	0.076
terminal S	0.069	0	0.002	0	0.061	0	0.002	0	0.051	0	0.002	0	0.036	0	0.002	0

TABLE 1.7(C): DATA AND COMPUTATION FLOW FOR GREEN RIVER CANADIAN ISBM INDEX (FIGURE 7)



Appendix Table 1.7(c). Data and computation flow (Figure 3) for 2003 GRN PSN preseason Canada ISBM index.

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	5	0	0.58	0.82	0.98	1	116.86	192.73	427.6	0.27
Geo St T	0	3	11	0	0.58	0.82	0.98	1	127.35	307.74	557.11	0.29
North N	0	10	0	0	0.58	0.82	1	1	23.2	91	0	0
Centr N	7	8	1	0	0.58	0.82	1	1	85.22	85.57	11.7	0.19
WCVI N	56	384	14	0	0.58	0.82	1	1	66.01	494.39	22.52	0.51
J De F N	6	4	2	1	0.58	0.82	1	1	141.42	114.3	64.96	23.47
John St N	0	1	0	0	0.58	0.82	1	1	61.13	152.28	54.57	0.6
Fraser N	0	0	0	0	0.58	0.82	0.98	1	0	0	0	0
Geo St S	0	812	418	17	0.58	0.82	0.98	1	347.71	2424.35	669.49	26.58

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	2	3	0	0	35827	45171	25361	3131
Geo St T	3	3	0	0	35827	45171	25361	3131
North N	5	1	0	0	35827	45171	21142	3146
Centr N	7	1	0	0	35827	45171	21142	3146
WCVI N	16	1	1	0	35827	45171	21142	3146
J De F N	1	0	0	0	35827	45171	21142	3146
John St N	0	0	0	0	35827	45171	21142	3146
Fraser N	0	0	0	0	35827	45171	25361	3131
Geo St S	265	224	39	2	35827	45171	25361	3131

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	170	193	35	0	0.003	0.004	0.017	0
Geo St T	139	159	49	0	0.004	0.007	0.022	0
North N	48	93	0	0	0.001	0.002	0	0
Centr N	125	87	10	0	0.002	0.002	0.001	0
WCVI N	0	0	0	0	0.002	0.011	0.001	0
J De F N	215	123	57	21	0.004	0.003	0.003	0.007
John St N	84	165	49	1	0.002	0.003	0.003	0
Fraser N	0	0	0	0	0	0	0	0
Geo St S	110	93	16	1	0.01	0.054	0.026	0.008

(8) sum of AEQ total mortality =	3396.68
(9) sum of cohort X AEQ BPER =	6691.13
(10) Canada ISBM =	0.51

**TABLE 1.7(D): GREEN RIVER BASE PERIOD EXPLOITATION RATES FOR CANADIAN FISHERIES (FIGURE 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	98	497	0	0	63	416	0	0	61	268	0	0	111	259	0
Geo St T	6	359	656	0	5	230	550	0	10	223	354	0	10	408	342	0
North N	0	106	0	0	0	68	0	0	0	66	0	0	0	121	0	0
Centr N	83	90	9	0	80	58	8	0	147	56	5	0	149	102	5	0
WCVI N	100	604	19	0	96	387	16	0	176	375	10	0	179	686	10	0
J De F N	255	139	56	19	246	89	47	18	451	86	30	15	457	158	29	10
John St N	72	180	46	0	70	115	39	0	127	112	25	0	129	204	24	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	649	2784	750	29	627	1785	629	28	1146	1730	404	23	221	3131	391	15

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	231	138	16	0	208	83	13	0	428	90	9	0	422	160	8	0
Geo St T	277	19	12	0	239	11	10	0	423	11	6	0	396	19	6	0
North N	48	6	0	0	40	3	0	0	84	3	0	0	81	6	0	0
Centr N	99	18	1	0	89	10	1	0	139	9	0	0	126	14	0	0
WCVI N	32	2	1	0	31	1	1	0	55	1	0	0	49	2	1	0
J De F N	25	1	0	0	23	1	0	0	43	1	0	0	43	1	0	0
John St N	58	8	0	1	52	5	0	0	82	4	0	0	66	6	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	48	192	53	2	46	123	44	2	83	119	28	2	962	223	27	1

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
Geo St T	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
North N	40924	45116	18137	2613	39535	28931	15219	2474	72276	28040	9782	2075	73361	51254	9469	1334
Centr N	40924	45116	18137	2613	39535	28931	15219	2474	72276	28040	9782	2075	73361	51254	9469	1334
WCVI N	40924	45116	18137	2613	39535	28931	15219	2474	72276	28040	9782	2075	73361	51254	9469	1334
J De F N	40924	45116	18137	2613	39535	28931	15219	2474	72276	28040	9782	2075	73361	51254	9469	1334
John St N	40924	45116	18137	2613	39535	28931	15219	2474	72276	28040	9782	2075	73361	51254	9469	1334
Fraser N	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889
Geo St S	40924	45116	29803	3701	39535	28931	24988	3503	72276	28040	16066	2939	73361	51254	15558	1889

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.004	0.017	0	0.003	0.004	0.017	0	0.003	0.004	0.017	0	0.003	0.004	0.017	0
Geo St T	0.004	0.007	0.022	0	0.004	0.007	0.022	0	0.003	0.007	0.022	0	0.003	0.007	0.022	0
North N	0.001	0.002	0	0	0.001	0.002	0	0	0.001	0.002	0	0	0.001	0.002	0	0
Centr N	0.003	0.002	0.001	0	0.002	0.002	0.001	0	0.002	0.002	0.001	0	0.002	0.002	0.001	0
WCVI N	0.002	0.011	0.001	0	0.002	0.011	0.001	0	0.002	0.011	0.001	0	0.002	0.011	0.001	0
J De F N	0.004	0.003	0.003	0.007	0.004	0.003	0.003	0.007	0.004	0.003	0.003	0.007	0.004	0.003	0.003	0.007
John St N	0.002	0.003	0.003	0	0.002	0.003	0.003	0	0.002	0.003	0.003	0	0.002	0.003	0.003	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.01	0.054	0.026	0.008	0.01	0.054	0.026	0.008	0.01	0.054	0.026	0.008	0.009	0.053	0.026	0.009

## APPENDIX 2: CALCULATION OF PRESEASON ISBM INDEX FOR COLUMBIA RIVER STOCKS

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## Methods to compute preseason ISBM index for Columbia River stocks

The preseason ISBM indices for Columbia Rivers stocks without external harvest rates (LRW , SUM, URB) are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input	output
ISBM cei file	Text file	Projected catch	
ChinookModel	VB.net program	ISBM cei file	ISBM ccc file
CalcISBM	VB.net program	ISBM ccc file	Model ISBM.xls

The preseason ISBM indices for the Columbia River stock with external harvest rates (Deschutes) are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input	output
<i>colrwiz.xls</i>	spreadsheet	various	
<i>DeschutesreconstructionforisbmYY YY.xls</i>	spreadsheet	<i>colrwiz.xls</i>	
<i>termER.xls</i>	spreadsheet	<i>Deschutesreconstructionforisb mYYYY.xls</i>	
ISBM cei file	Text file	Projected catch	
ChinookModel	VB.net program	ISBM cei file	ISBM ccc file
CalcISBM	VB.net program	ISBM ccc file	Model ISBM.xls

### Part 1: Update external harvests rates for the Deschutes

Copy the terminal run and catch data from *colrwiz.xls* and paste into *DeschutesreconstructionforisbmYYYY.xls* as follows:

sheet	column	label
TRuns	B	DES.TRIB
	C	URB.TRUN
Fallcat	B	URB.Z15
	C	URN.Z6
	K	DES.HARV
SprCat	B	URB.BUOY10
	C	URB.CRSPTBEL
	D	URB.TRIBSPT
	E	URB.CRSPTABV
	L	URB.Z6SPT

Copy the external harvest rates from *deschutesreconstrnforisbm2005.xls* (cells AM5:An30) to *termER.xls*.

### Part 2: calculate the Deschutes ISBM index using external harvest rates in spreadsheet

Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER\_yyyy.xls* and write the ISBM indices to *model ISBM.xls* as follows.

- Make of a copy of the chinook model calibration folder that was used to calculate the SRFI index because the *cei* file in this folder has the *fp* controls for the current year replaces with expected catch . Name the new folder “preseason ISBM”. This folder should have 2 files named SRFI.cei and SRFI.ccc. Rename the both as ISBM.cei and ISBM.ccc. Rename the *p.op7* file as ISBMp.op7. Send a copy of ISBM.cei to Canada and ask if there are any changes to Canadian catch expectations.
- If you can not find a copy of the SRFI.cei and SRFI.ccc files, then modify a calibration *cei* file by replacing the *fp* controls for the most recent year with the expected catch and rename it as ISBM.cei. Make a copy of the *p.op7* file and rename it ISBMp.op7. Open ISBMp.op7 and update the following items (from top to bottom)
  - prefix (e.g. ISBM),
  - name of CEI file e.g. ISBM.CEI
- Go to the folder named Run *calcISBM.vb* using the IDE (for an unexplained reason, the *exe* file does not work).
- Enter the year for the ISBM index.
- Click on “use external rates”. Select “yes”. The program will prompt you for “termER\_yyyy.xls”.
- Click on “file”. Select ISBMp.op7 file.
- The program will ask you to “pick a stock”. Select *URB*. Click on “done picking stocks”.
- The program will write the ISBM indices to a spreadsheet named “*model ISBM.xls*”.

### Part 3: calculate the LRW, SUM, URB Deschutes ISBM index without external harvest rates

Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and write the ISBM indices to *model ISBM.xls* as described below.

- Same as for the Deschutes except do not Click on “use external rates”. When the program will ask you to “pick a stock”. Select *LRW*, *SUM*, and *URB*.

Relationship between stock names and 3 letter acronyms when using the program named “calcISBM”.		
Escapement Indicator stock name in Calibration and ERA report	Stock name in calcISBM.exe	External harvest rate
Deschutes	URB	termER_yyyy.xls
LRW	LRW	
SUM	SUM	
URB	URB	

**Table 2.1 (a): Data and Computation Flow for LRW US ISBM index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	59	843	1078	0	0.58	0.78	0.94	1	193.02	635.03	798.14	8.86
PgtNth N	28	15	0	0	0.58	0.78	1	1	112.3	56.02	0	0
PgtSth N	0	0	0	0	0.58	0.78	1	1	0	0	0	0
Wash Cst N	0	0	508	0	0.58	0.78	0.94	1	27.8	4.46	490.76	0.13
terminal N	55	59	71	106	1	1	1	1	405.06	419.63	453.14	630.99
Wash Ocn S	293	432	743	286	0.58	0.78	0.94	1	232.22	402.16	826.13	329.57
PgtNth S	0	28	0	0	0.58	0.78	0.94	1	88.11	112.47	0.11	0.37
PgtSth S	0	25	0	0	0.58	0.78	0.94	1	198.9	57.48	0.25	0.79
terminal S	1635	771	1030	1777	1	1	1	1	1828.96	859.02	1146.55	1978.97
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	234	171	65	7	27943	24645	24940	11906				
PgtNth N	15	2	0	0	27943	24645	10858	11304				
PgtSth N	0	0	0	0	27943	24645	10858	11304				
Wash Cst N	41	5	1	0	27943	24645	24940	11906				
terminal N	41	35	19	7	3205	3554	10858	11304				
Wash Ocn S	63	35	52	20	27943	24645	24940	11906				
PgtNth S	29	5	0	0	27943	24645	24940	11906				
PgtSth S	100	8	0	0	27943	24645	24940	11906				
terminal S	119	53	71	123	3205	3554	10858	11304				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.007	0.026	0.032	0.001				
PgtNth N	0	0	0	0	0.004	0.002	0	0				
PgtSth N	0	0	0	0	0	0	0	0				
Wash Cst N	0	0	0	0	0.001	0	0.02	0				
terminal N	0	0	0	0	0.126	0.118	0.042	0.056				
Wash Ocn S	0	0	0	0	0.008	0.016	0.033	0.028				
PgtNth S	92	12	0	0	0.003	0.005	0	0				
PgtSth S	134	9	0	0	0.007	0.002	0	0				
terminal S	0	0	0	0	0.571	0.242	0.106	0.175				
(8) sum of AEQ total mortality =				10462.34								
(9) sum of cohort X AEQ BPER =				12297.39								
(10) US ISBM =				0.85								

**Table 2.1(b): Base period exploitation rates for LRW for US Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87	1338	944	0	36	1001	1217	0	56	424	938	0	38	633	379	0
PgtNth N	239	137	0	0	99	102	0	0	155	43	0	0	105	65	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0	0	625	0	0	0	806	0	0	0	621	0	0	0	251	0
terminal N	493	739	698	240	118	429	901	356	454	272	746	458	284	410	245	306
Wash Ocn	653	1038	985	134	269	776	1270	198	423	329	979	256	287	491	395	168
PgtNth S	87	273	0	0	36	204	0	0	56	87	0	0	38	129	0	0
PgtSth S	218	137	0	0	90	102	0	0	141	43	0	0	96	65	0	0
terminal S	2628	1716	1815	721	631	997	2343	1069	2422	632	1939	1374	1517	951	636	918
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	693	504	84	4	233	310	92	5	374	134	72	7	248	196	29	5
PgtNth N	157	20	0	0	77	18	0	0	102	6	0	0	62	8	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	94	12	1	0	45	10	2	0	64	4	1	0	42	6	0	0
terminal N	133	159	69	5	31	88	85	8	116	55	70	10	82	94	26	7
Wash Ocn	178	88	69	9	72	66	90	14	114	28	69	18	73	41	28	12
PgtNth S	230	42	0	0	99	31	0	0	148	13	0	0	92	20	0	0
PgtSth S	461	24	0	0	211	18	0	1	319	8	0	1	218	12	0	0
terminal S	194	119	125	50	46	69	162	74	178	44	134	95	111	66	44	63
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
PgtNth N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
PgtSth N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
Wash Cst I	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
terminal N	4945	7589	18374	4400	1188	4408	23721	6525	4557	2794	19635	8393	2854	4206	6440	5604
Wash Ocn	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
PgtNth S	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
PgtSth S	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
terminal S	4945	7589	18374	4400	1188	4408	23721	6525	4557	2794	19635	8393	2854	4206	6440	5604
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.008	0.027	0.032	0.001	0.006	0.025	0.032	0.001	0.007	0.025	0.032	0.001	0.007	0.026	0.032	0.001
PgtNth N	0.004	0.002	0	0	0.004	0.002	0	0	0.004	0.002	0	0	0.004	0.002	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst I	0.001	0	0.02	0	0.001	0	0.02	0	0.001	0	0.02	0	0.001	0	0.02	0
terminal N	0.127	0.118	0.042	0.056	0.125	0.117	0.042	0.056	0.125	0.117	0.042	0.056	0.128	0.12	0.042	0.056
Wash Ocn	0.008	0.016	0.033	0.028	0.008	0.016	0.033	0.028	0.009	0.016	0.033	0.028	0.008	0.016	0.033	0.028
PgtNth S	0.003	0.005	0	0	0.003	0.005	0	0	0.003	0.005	0	0	0.003	0.005	0	0
PgtSth S	0.007	0.002	0	0	0.007	0.002	0	0	0.007	0.002	0	0	0.007	0.002	0	0
terminal S	0.571	0.242	0.106	0.175	0.571	0.242	0.106	0.175	0.571	0.242	0.106	0.175	0.57	0.242	0.106	0.175

**Table 2.1(c): Data and Computation flow for LRW Canadian ISBM Index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	3	6	0.58	0.78	0.94	1	91.84	79.3	267.49	439.79
Geo St T	0	1	0	3	0.58	0.78	0.94	1	97.77	104.33	0.35	126.46
North N	0	6	11	0	0.58	0.78	1	1	18.23	51.12	118.13	0
Centr N	19	3	0	0	0.58	0.78	1	1	150	35.82	0	0
WCVI N	0	0	0	0	0.58	0.78	1	1	0	0	0	0
J De F N	1	3	2	0	0.58	0.78	1	1	34.14	98.12	70.79	0.3
John St N	0	0	0	0	0.58	0.78	1	1	56.03	3.03	0	0
Fraser N	0	0	0	0	0.58	0.78	0.94	1	0	0	0	0
Geo St S	0	0	0	0	0.58	0.78	0.94	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	2	1	0	0	27943	24645	24940	11906
Geo St T	2	2	0	0	27943	24645	24940	11906
North N	4	0	0	0	27943	24645	10858	11304
Centr N	5	1	0	0	27943	24645	10858	11304
WCVI N	0	0	0	0	27943	24645	10858	11304
J De F N	0	0	0	0	27943	24645	10858	11304
John St N	0	0	0	0	27943	24645	10858	11304
Fraser N	0	0	0	0	27943	24645	24940	11906
Geo St S	0	0	0	0	27943	24645	24940	11906

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	133	104	28	21	0.003	0.003	0.011	0.037
Geo St T	109	85	9	11	0.003	0.004	0	0.011
North N	37	53	96	0	0.001	0.002	0.011	0
Centr N	214	37	0	0	0.005	0.001	0	0
WCVI N	0	0	0	0	0	0	0	0
J De F N	52	108	62	0	0.001	0.004	0.007	0
John St N	78	2	0	0	0.002	0	0	0
Fraser N	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0

(8) sum of AEQ total mortality =	949.28
(9) sum of cohort X AEQ BPER =	1843.01
(10) Canada ISBM =	0.52



**Table 2.1(d): Base period Exploitation Rates for LRW for Canadian Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	55	328	187	0	41	423	278	0	17	326	359	0	26	132	235
Geo St T	0	273	0	54	0	204	0	79	0	87	0	102	0	129	0	67
North N	0	137	199	0	0	102	257	0	0	43	213	0	0	65	70	0
Centr N	414	82	0	0	171	61	0	0	268	26	0	0	182	39	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	87	273	120	0	36	204	154	0	56	87	128	0	38	129	42	0
John St N	131	0	0	0	54	0	0	0	85	0	0	0	57	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	327	167	13	4	126	117	16	5	222	56	13	7	146	81	5	5
Geo St T	392	21	0	1	145	14	1	2	219	6	0	3	137	8	0	2
North N	69	7	0	0	24	4	1	0	44	2	1	0	28	3	0	0
Centr N	140	21	0	0	54	15	0	0	72	5	0	0	44	7	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	36	2	0	0	14	1	0	0	22	0	0	0	15	1	0	0
John St N	83	10	0	0	31	7	0	0	42	3	0	0	23	3	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
Geo St T	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
North N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
Centr N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
WCVI N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
J De F N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
John St N	57914	55002	18374	4400	23896	41154	23721	6525	37465	17441	19635	8393	25415	26031	6440	5604
Fraser N	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477
Geo St S	57914	55002	30707	5171	23896	41154	39618	7667	37465	17441	30523	9898	25415	26031	12335	6477

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.003	0.011	0.037	0.003	0.003	0.011	0.037	0.004	0.003	0.011	0.037	0.003	0.003	0.011	0.037
Geo St T	0.004	0.004	0	0.011	0.003	0.004	0	0.011	0.003	0.004	0	0.011	0.003	0.004	0	0.011
North N	0.001	0.002	0.011	0	0.001	0.002	0.011	0	0.001	0.002	0.011	0	0.001	0.002	0.011	0
Centr N	0.006	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0.001	0.004	0.007	0	0.001	0.004	0.007	0	0.001	0.004	0.007	0	0.001	0.004	0.007	0
John St N	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 2.2 (a): Data and Computation Flow for URB US ISBM index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1089	3304	485	0.58	0.81	0.96	1	1943.28	1777.28	2699.54	425.76
PgtNth N	6	4	0	0	0.58	0.81	1	1	535.73	69.78	0	0
PgtSth N	0	0	138	0	0.58	0.81	1	1	0	0	644.31	115.2
Wash Cst N	0	0	127	0	0.58	0.81	0.96	1	321.38	34.12	130.3	1.05
terminal N	848	9696	25223	5002	1	1	1	1	1588.13	13299.97	32934.89	6545.27
Wash Ocn S	0	1455	1695	556	0.58	0.81	0.96	1	418.21	1412.22	1888.68	640.82
PgtNth S	0	307	60	153	0.58	0.81	0.96	1	719.74	1271.12	281.43	740.7
PgtSth S	0	102	0	0	0.58	0.81	0.96	1	1570.95	245.46	2.15	6.69
terminal S	7623	3418	2695	3614	1	1	1	1	822.9	349.67	274.91	368.68
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	2631	1148	416	72	316108	183894	217174	100499				
PgtNth N	174	13	0	0	316108	183894	126365	87506				
PgtSth N	0	0	200	46	316108	183894	126365	87506				
Wash Cst N	461	36	7	1	316108	183894	217174	100499				
terminal N	235	389	224	51	18601	39699	126365	87506				
Wash Ocn S	482	138	124	39	316108	183894	217174	100499				
PgtNth S	324	54	9	23	316108	183894	217174	100499				
PgtSth S	1136	47	2	2	316108	183894	217174	100499				
terminal S	561	237	186	249	18601	39699	126365	87506				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.006	0.01	0.012	0.004				
PgtNth N	0	0	0	0	0.002	0	0	0				
PgtSth N	0	0	0	0	0	0	0.005	0.001				
Wash Cst N	0	0	0	0	0.001	0	0.001	0				
terminal N	0	0	0	0	0.085	0.335	0.261	0.075				
Wash Ocn S	0	0	0	0	0.001	0.008	0.009	0.006				
PgtNth S	1037	119	19	47	0.002	0.007	0.001	0.007				
PgtSth S	1511	55	2	3	0.005	0.001	0	0				
terminal S	0	0	0	0	0.044	0.009	0.002	0.004				
(8) sum of AEQ total mortality =				75724.81								
(9) sum of cohort X AEQ BPER =				74080.36								
(10) US ISBM =				1.02								

**Table 2.2(b): Base period exploitation rates for URB for US Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	464	1780	76	0	479	861	174	0	287	780	110	0	560	446	37
PgtNth N	12	11	0	0	7	11	0	0	14	7	0	0	28	13	0	0
PgtSth N	0	0	77	0	0	0	27	0	0	0	49	0	0	0	31	0
Wash Cst N	0	0	97	0	0	0	47	0	0	0	42	0	0	0	24	0
terminal N	808	2240	18041	1133	242	7290	6344	2582	810	5291	11442	1621	1488	18390	7380	563
Wash Ocn S	0	940	1383	132	0	969	669	301	0	580	606	190	0	1133	347	64
PgtNth S	18	811	193	142	10	837	93	324	21	501	84	205	42	979	48	69
PgtSth S	60	149	0	0	35	154	0	0	70	92	0	0	140	180	0	0
terminal S	539	59	143	61	161	191	50	138	540	138	91	87	992	481	58	30
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1887	972	393	20	893	818	158	38	1824	502	146	25	3587	958	82	8
PgtNth N	429	40	0	0	294	48	0	0	499	25	0	0	901	43	0	0
PgtSth N	0	0	286	21	0	0	90	42	0	0	195	32	0	0	112	10
Wash Cst N	258	24	6	0	172	28	3	1	312	15	3	0	603	29	1	0
terminal N	372	149	265	19	106	461	89	42	351	332	159	26	729	1302	116	10
Wash Ocn S	362	98	103	9	205	101	50	21	416	61	45	14	773	115	26	5
PgtNth S	596	122	29	21	361	126	14	49	684	75	13	31	1257	147	7	10
PgtSth S	1182	30	2	1	766	32	1	4	1471	19	1	2	2979	37	0	1
terminal S	71	4	10	4	21	14	3	10	71	10	6	6	127	35	4	2
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtNth N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
PgtSth N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Wash Cst N	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
terminal N	13773	7126	70227	15395	4123	23191	24695	35097	13813	16834	44538	22034	25364	58504	28729	7646
Wash Ocn S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtNth S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtSth S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
terminal S	13773	7126	70227	15395	4123	23191	24695	35097	13813	16834	44538	22034	25364	58504	28729	7646
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.01	0.013	0.004	0.006	0.009	0.012	0.004	0.006	0.01	0.013	0.004	0.006	0.01	0.013	0.004
PgtNth N	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0	0.001	0	0	0
PgtSth N	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001
Wash Cst N	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0
terminal N	0.086	0.335	0.261	0.075	0.084	0.334	0.26	0.075	0.084	0.334	0.26	0.075	0.087	0.337	0.261	0.075
Wash Ocn S	0.001	0.007	0.009	0.006	0.001	0.008	0.008	0.006	0.001	0.008	0.009	0.006	0.001	0.008	0.009	0.006
PgtNth S	0.002	0.006	0.001	0.007	0.002	0.007	0.001	0.007	0.002	0.007	0.001	0.007	0.002	0.007	0.001	0.007
PgtSth S	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0
terminal S	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004

**Table 2.2(c): Data and Computation flow for URB Canadian ISBM Index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	19	73	14	0.58	0.81	0.96	1	1060.65	2458.59	6058.2	1108.56
Geo St T	0	3	29	0	0.58	0.81	0.96	1	1130.69	327.26	1468.18	9.33
North N	56	144	570	25	0.58	0.81	1	1	560.36	1246.56	5957.51	258.66
Centr N	323	253	88	0	0.58	0.81	1	1	2454.65	2274.62	954.88	5.23
WCVI N	107	0	0	0	0.58	0.81	1	1	240.73	5.22	0	0
J De F N	47	8	0	0	0.58	0.81	1	1	1132.64	251.35	0	0
John St N	2	1	6	0	0.58	0.81	1	1	438.3	255.69	1150.71	74.37
Fraser N	0	0	0	0	0.58	0.81	0.96	1	0	0	0	0
Geo St S	0	264	459	0	0.58	0.81	0.96	1	638.16	795.99	729.5	2.72
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	20	10	3	0	316108	183894	217174	100499				
Geo St T	27	13	2	0	316108	183894	217174	100499				
North N	45	3	0	0	316108	183894	126365	87506				
Centr N	60	6	1	0	316108	183894	126365	87506				
WCVI N	140	4	0	0	316108	183894	126365	87506				
J De F N	5	0	0	0	316108	183894	126365	87506				
John St N	1	0	0	0	316108	183894	126365	87506				
Fraser N	0	0	0	0	316108	183894	217174	100499				
Geo St S	2335	703	123	15	316108	183894	217174	100499				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1501	840	402	60	0.003	0.013	0.028	0.011				
Geo St T	1228	614	185	13	0.004	0.002	0.007	0				
North N	901	1250	4861	211	0.002	0.007	0.047	0.003				
Centr N	3416	2278	780	5	0.008	0.012	0.008	0				
WCVI N	0	0	0	0	0.001	0	0	0				
J De F N	1672	269	0	0	0.004	0.001	0	0				
John St N	563	273	1031	71	0.001	0.001	0.009	0.001				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	974	293	50	6	0.002	0.004	0.003	0				
(8) sum of AEQ total mortality =				22656.93								
(9) sum of cohort X AEQ BPER =				33049.33								
(10) Canada ISBM =				0.69								

**Table 2.2(d): Base period Exploitation Rates for URB for Canadian Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1447	4649	239	0	1492	2248	544	0	893	2036	344	0	1745	1165	116
Geo St T	0	208	1134	0	0	215	548	0	0	129	497	0	0	251	284	0
North N	294	902	3309	46	171	930	1164	104	341	557	2099	65	686	1088	1354	23
Centr N	1736	1634	528	0	1008	1684	186	0	2009	1009	335	0	4049	1970	216	0
WCVI N	84	0	0	0	49	0	0	0	97	0	0	0	196	0	0	0
J De F N	859	182	0	0	499	187	0	0	994	112	0	0	2003	219	0	0
John St N	180	171	638	10	105	176	224	23	209	105	404	14	420	206	261	5
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	48	545	533	0	28	561	258	0	56	336	233	0	21	650	134	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	892	358	119	6	483	346	56	13	1083	231	53	9	2120	440	30	3
Geo St T	1069	36	22	2	555	33	10	5	1070	19	9	3	1989	35	5	1
North N	187	14	2	0	94	12	1	0	213	8	1	0	409	16	1	0
Centr N	383	43	3	1	207	41	1	2	353	21	2	1	636	37	1	0
WCVI N	125	4	0	0	71	4	0	0	140	2	0	0	245	4	0	0
J De F N	98	3	0	0	53	3	0	0	110	2	0	0	217	4	0	0
John St N	226	20	2	3	120	19	1	6	207	10	1	5	331	15	1	1
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	14	38	42	0	7	39	20	0	14	23	18	0	4761	63	10	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Geo St T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
North N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Centr N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
WCVI N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
J De F N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
John St N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Fraser N	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Geo St S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.013	0.028	0.011	0.003	0.013	0.027	0.011	0.004	0.014	0.028	0.011	0.003	0.014	0.029	0.011
Geo St T	0.004	0.002	0.007	0	0.004	0.002	0.007	0	0.004	0.002	0.007	0	0.003	0.002	0.007	0
North N	0.002	0.006	0.047	0.003	0.002	0.007	0.047	0.003	0.002	0.007	0.047	0.003	0.002	0.007	0.047	0.003
Centr N	0.008	0.012	0.008	0	0.008	0.012	0.008	0	0.008	0.013	0.008	0	0.007	0.013	0.008	0
WCVI N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
J De F N	0.004	0.001	0	0	0.004	0.001	0	0	0.004	0.001	0	0	0.003	0.001	0	0
John St N	0.002	0.001	0.009	0.001	0.001	0.001	0.009	0.001	0.001	0.001	0.009	0.001	0.001	0.001	0.009	0.001
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0.007	0.005	0.003	0

**Table 2.3 (a): Data and Computation Flow for Deschutes US ISBM index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1089	3304	485	0.58	0.81	0.96	1	1943.28	1777.28	2699.54	425.76
PgtNth N	6	4	0	0	0.58	0.81	1	1	535.73	69.78	0	0
PgtSth N	0	0	138	0	0.58	0.81	1	1	0	0	644.31	115.2
Wash Cst I	0	0	127	0	0.58	0.81	0.96	1	321.38	34.12	130.3	1.05
terminal N	848	9696	25223	5002	1	1	1	1	1588.13	13299.97	32934.89	6545.27
Wash Ocn	0	1455	1695	556	0.58	0.81	0.96	1	418.21	1412.22	1888.68	640.82
PgtNth S	0	307	60	153	0.58	0.81	0.96	1	719.74	1271.12	281.43	740.7
PgtSth S	0	102	0	0	0.58	0.81	0.96	1	1570.95	245.46	2.15	6.69
terminal S	7623	3418	2695	3614	1	1	1	1	4526.54	9660.73	30750.85	21294.64

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	2631	1148	416	72	316108	183894	217174	100499
PgtNth N	174	13	0	0	316108	183894	126365	87506
PgtSth N	0	0	200	46	316108	183894	126365	87506
Wash Cst I	461	36	7	1	316108	183894	217174	100499
terminal N	235	389	224	51	18601	39699	126365	87506
Wash Ocn	482	138	124	39	316108	183894	217174	100499
PgtNth S	324	54	9	23	316108	183894	217174	100499
PgtSth S	1136	47	2	2	316108	183894	217174	100499
terminal S	561	237	186	249	18601	39699	126365	87506

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.01	0.012	0.004
PgtNth N	0	0	0	0	0.002	0	0	0
PgtSth N	0	0	0	0	0	0	0.005	0.001
Wash Cst I	0	0	0	0	0.001	0	0.001	0
terminal N	0	0	0	0	0.085	0.335	0.261	0.075
Wash Ocn	0	0	0	0	0.001	0.008	0.009	0.006
PgtNth S	1037	119	19	47	0.002	0.007	0.001	0.007
PgtSth S	1511	55	2	3	0.005	0.001	0	0
terminal S	0	0	0	0	0.243	0.243	0.243	0.243

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal N	0.09	0.09	0.09	0.09	18601	39699	126365	87506	1674.09	3572.91	11372.85	7875.58
terminal S	0.03	0.03	0.03	0.03	18601	39699	126365	87506	558.03	1190.97	3790.95	2625.19

(8) sum of AEQ total mortality =	48135.05
(9) sum of cohort X AEQ BPER =	85853.52
(10) US ISBM =	0.56

**Table 2.3(b): Base period exploitation rates for Deschutes for US Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	464	1780	76	0	479	861	174	0	287	780	110	0	560	446	37
PgtNth N	12	11	0	0	7	11	0	0	14	7	0	0	28	13	0	0
PgtSth N	0	0	77	0	0	0	27	0	0	0	49	0	0	0	31	0
Wash Cst N	0	0	97	0	0	0	47	0	0	0	42	0	0	0	24	0
terminal N	808	2240	18041	1133	242	7290	6344	2582	810	5291	11442	1621	1488	18390	7380	563
Wash Ocn S	0	940	1383	132	0	969	669	301	0	580	606	190	0	1133	347	64
PgtNth S	18	811	193	142	10	837	93	324	21	501	84	205	42	979	48	69
PgtSth S	60	149	0	0	35	154	0	0	70	92	0	0	140	180	0	0
terminal S	539	59	143	61	161	191	50	138	540	138	91	87	992	481	58	30

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1887	972	393	20	893	818	158	38	1824	502	146	25	3587	958	82	8
PgtNth N	429	40	0	0	294	48	0	0	499	25	0	0	901	43	0	0
PgtSth N	0	0	286	21	0	0	90	42	0	0	195	32	0	0	112	10
Wash Cst N	258	24	6	0	172	28	3	1	312	15	3	0	603	29	1	0
terminal N	372	149	265	19	106	461	89	42	351	332	159	26	729	1302	116	10
Wash Ocn S	362	98	103	9	205	101	50	21	416	61	45	14	773	115	26	5
PgtNth S	596	122	29	21	361	126	14	49	684	75	13	31	1257	147	7	10
PgtSth S	1182	30	2	1	766	32	1	4	1471	19	1	2	2979	37	0	1
terminal S	71	4	10	4	21	14	3	10	71	10	6	6	127	35	4	2

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtNth N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
PgtSth N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Wash Cst N	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
terminal N	13773	7126	70227	15395	4123	23191	24695	35097	13813	16834	44538	22034	25364	58504	28729	7646
Wash Ocn S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtNth S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
PgtSth S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
terminal S	13773	7126	70227	15395	4123	23191	24695	35097	13813	16834	44538	22034	25364	58504	28729	7646

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.01	0.013	0.004	0.006	0.009	0.012	0.004	0.006	0.01	0.013	0.004	0.006	0.01	0.013	0.004
PgtNth N	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0	0.001	0	0	0
PgtSth N	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001
Wash Cst N	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0	0.001	0
terminal N	0.086	0.335	0.261	0.075	0.084	0.334	0.26	0.075	0.084	0.334	0.26	0.075	0.087	0.337	0.261	0.075
Wash Ocn S	0.001	0.007	0.009	0.006	0.001	0.008	0.008	0.006	0.001	0.008	0.009	0.006	0.001	0.008	0.009	0.006
PgtNth S	0.002	0.006	0.001	0.007	0.002	0.007	0.001	0.007	0.002	0.007	0.001	0.007	0.002	0.007	0.001	0.007
PgtSth S	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0	0.005	0.001	0	0
terminal S	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004	0.044	0.009	0.002	0.004

**Table 2.3(c): Data and Computation flow for Deschutes Canadian ISBM Index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	19	73	14	0.58	0.81	0.96	1	1060.65	2458.59	6058.2	1108.56
Geo St T	0	3	29	0	0.58	0.81	0.96	1	1130.69	327.26	1468.18	9.33
North N	56	144	570	25	0.58	0.81	1	1	560.36	1246.56	5957.51	258.66
Centr N	323	253	88	0	0.58	0.81	1	1	2454.65	2274.62	954.88	5.23
WCVI N	107	0	0	0	0.58	0.81	1	1	240.73	5.22	0	0
J De F N	47	8	0	0	0.58	0.81	1	1	1132.64	251.35	0	0
John St N	2	1	6	0	0.58	0.81	1	1	438.3	255.69	1150.71	74.37
Fraser N	0	0	0	0	0.58	0.81	0.96	1	0	0	0	0
Geo St S	0	264	459	0	0.58	0.81	0.96	1	638.16	795.99	729.5	2.72
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	20	10	3	0	316108	183894	217174	100499				
Geo St T	27	13	2	0	316108	183894	217174	100499				
North N	45	3	0	0	316108	183894	126365	87506				
Centr N	60	6	1	0	316108	183894	126365	87506				
WCVI N	140	4	0	0	316108	183894	126365	87506				
J De F N	5	0	0	0	316108	183894	126365	87506				
John St N	1	0	0	0	316108	183894	126365	87506				
Fraser N	0	0	0	0	316108	183894	217174	100499				
Geo St S	2335	703	123	15	316108	183894	217174	100499				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1501	840	402	60	0.003	0.013	0.028	0.011				
Geo St T	1228	614	185	13	0.004	0.002	0.007	0				
North N	901	1250	4861	211	0.002	0.007	0.047	0.003				
Centr N	3416	2278	780	5	0.008	0.012	0.008	0				
WCVI N	0	0	0	0	0.001	0	0	0				
J De F N	1672	269	0	0	0.004	0.001	0	0				
John St N	563	273	1031	71	0.001	0.001	0.009	0.001				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	974	293	50	6	0.002	0.004	0.003	0				
(8) sum of AEQ total mortality =				22656.93								
(9) sum of cohort X AEQ BPER =				33049.33								
(10) Canada ISBM =				0.69								



**Table 2.3(d): Base period Exploitation Rates for Deschutes for Canadian Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1447	4649	239	0	1492	2248	544	0	893	2036	344	0	1745	1165	116
Geo St T	0	208	1134	0	0	215	548	0	0	129	497	0	0	251	284	0
North N	294	902	3309	46	171	930	1164	104	341	557	2099	65	686	1088	1354	23
Centr N	1736	1634	528	0	1008	1684	186	0	2009	1009	335	0	4049	1970	216	0
WCVI N	84	0	0	0	49	0	0	0	97	0	0	0	196	0	0	0
J De F N	859	182	0	0	499	187	0	0	994	112	0	0	2003	219	0	0
John St N	180	171	638	10	105	176	224	23	209	105	404	14	420	206	261	5
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	48	545	533	0	28	561	258	0	56	336	233	0	21	650	134	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	892	358	119	6	483	346	56	13	1083	231	53	9	2120	440	30	3
Geo St T	1069	36	22	2	555	33	10	5	1070	19	9	3	1989	35	5	1
North N	187	14	2	0	94	12	1	0	213	8	1	0	409	16	1	0
Centr N	383	43	3	1	207	41	1	2	353	21	2	1	636	37	1	0
WCVI N	125	4	0	0	71	4	0	0	140	2	0	0	245	4	0	0
J De F N	98	3	0	0	53	3	0	0	110	2	0	0	217	4	0	0
John St N	226	20	2	3	120	19	1	6	207	10	1	5	331	15	1	1
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	14	38	42	0	7	39	20	0	14	23	18	0	4761	63	10	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Geo St T	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
North N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Centr N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
WCVI N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
J De F N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
John St N	158119	110340	70227	15395	91817	113767	24695	35097	183006	68132	44538	22034	368725	133077	28729	7646
Fraser N	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Geo St S	158119	110340	164636	22189	91817	113767	79590	50566	183006	68132	72106	31980	368725	133077	41248	10788
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.013	0.028	0.011	0.003	0.013	0.027	0.011	0.004	0.014	0.028	0.011	0.003	0.014	0.029	0.011
Geo St T	0.004	0.002	0.007	0	0.004	0.002	0.007	0	0.004	0.002	0.007	0	0.003	0.002	0.007	0
North N	0.002	0.006	0.047	0.003	0.002	0.007	0.047	0.003	0.002	0.007	0.047	0.003	0.002	0.007	0.047	0.003
Centr N	0.008	0.012	0.008	0	0.008	0.012	0.008	0	0.008	0.013	0.008	0	0.007	0.013	0.008	0
WCVI N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
J De F N	0.004	0.001	0	0	0.004	0.001	0	0	0.004	0.001	0	0	0.003	0.001	0	0
John St N	0.002	0.001	0.009	0.001	0.001	0.001	0.009	0.001	0.001	0.001	0.009	0.001	0.001	0.001	0.009	0.001
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0.007	0.005	0.003	0

**Table 2.4 (a): Data and Computation Flow for Columbia Upriver Summers US ISBM index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	2309	0	0.55	0.77	0.95	1	484.47	1086.09	1839.49	39.67
PgtNth N	0	0	0	76	0.55	0.77	1	1	0	0	50.31	327.56
PgtSth N	0	0	0	0	0.55	0.77	1	1	0	0	0	0
Wash Cst N	0	0	0	0	0.55	0.77	0.95	1	0	0	0	0
terminal N	201	272	243	0	1	1	1	1	771.27	1041.3	1058.81	65.25
Wash Ocn S	0	1022	1716	0	0.55	0.77	0.95	1	104.22	942.87	1881.09	0.73
PgtNth S	0	0	0	0	0.55	0.77	0.95	1	0	0	0	0
PgtSth S	0	0	0	0	0.55	0.77	0.95	1	0	0	0	0
terminal S	0	459	546	0	1	1	1	1	8.75	490.45	583.5	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	711	1142	273	32	85462	187398	140079	53311				
PgtNth N	0	0	3	1	85462	187398	64173	53047				
PgtSth N	0	0	0	0	85462	187398	64173	53047				
Wash Cst N	0	0	0	0	85462	187398	140079	53311				
terminal N	46	59	114	31	3600	5994	64173	53047				
Wash Ocn S	130	108	123	1	85462	187398	140079	53311				
PgtNth S	0	0	0	0	85462	187398	140079	53311				
PgtSth S	0	0	0	0	85462	187398	140079	53311				
terminal S	7	32	38	0	3600	5994	64173	53047				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.006	0.006	0.013	0.001				
PgtNth N	0	0	0	0	0	0	0.001	0.006				
PgtSth N	0	0	0	0	0	0	0	0				
Wash Cst N	0	0	0	0	0	0	0	0				
terminal N	0	0	0	0	0.214	0.174	0.016	0.001				
Wash Ocn S	0	0	0	0	0.001	0.005	0.013	0				
PgtNth S	0	0	0	0	0	0	0	0				
PgtSth S	0	0	0	0	0	0	0	0				
terminal S	0	0	0	0	0.002	0.082	0.009	0				
(8) sum of AEQ total mortality =				8557.72								
(9) sum of cohort X AEQ BPER =				10775.84								
(10) US ISBM =				0.79								

**Table 2.4(b): Base period exploitation rates for Columbia Upriver Summers for US Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	641	0	0	0	593	0	0	0	497	0	0	0	397	0
PgtNth N	0	0	0	79	0	0	0	79	0	0	0	73	0	0	0	60
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	575	297	237	0	461	248	220	0	469	199	183	0	537	202	152	0
Wash Ocn S	0	383	721	0	0	320	667	0	0	256	559	0	0	260	447	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	148	158	0	0	124	147	0	0	99	122	0	0	101	101	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	885	569	132	13	575	388	101	11	600	318	86	10	675	316	68	8
PgtNth N	0	0	14	3	0	0	13	3	0	0	13	4	0	0	9	3
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	83	41	70	17	63	32	62	16	64	26	51	14	82	29	48	14
Wash Ocn S	170	46	52	0	132	38	48	0	137	31	41	0	145	30	32	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	8	10	11	0	6	9	10	0	6	7	8	0	7	7	7	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
PgtNth N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
PgtSth N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
Wash Cst N	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
terminal N	3069	1938	18611	13284	2456	1622	17229	13346	2501	1298	14340	12323	2864	1319	11876	10216
Wash Ocn S	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
PgtNth S	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
PgtSth S	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
terminal S	3069	1938	18611	13284	2456	1622	17229	13346	2501	1298	14340	12323	2864	1319	11876	10216

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.007	0.013	0.001	0.005	0.005	0.013	0.001	0.005	0.006	0.013	0.001	0.005	0.005	0.013	0.001
PgtNth N	0	0	0.001	0.006	0	0	0.001	0.006	0	0	0.001	0.006	0	0	0.001	0.006
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0.214	0.174	0.017	0.001	0.213	0.173	0.016	0.001	0.213	0.173	0.016	0.001	0.216	0.175	0.017	0.001
Wash Ocn S	0.001	0.005	0.013	0	0.001	0.005	0.013	0	0.001	0.005	0.013	0	0.001	0.005	0.013	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0.002	0.082	0.009	0	0.002	0.082	0.009	0	0.002	0.082	0.009	0	0.002	0.082	0.009	0

**Table 2.4(c): Data and Computation flow for Columbia Upriver Summers Canadian ISBM Index (Figure 7)**

Fishery	(1) 2003 legal catch (ccc file)					(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	43	105	28		0.55	0.77	0.95	1	264.48	4717.58	8554.4	2250.72
Geo St T	0	12	48	0		0.55	0.77	0.95	1	281.75	1065.32	2380.14	4.95
North N	0	0	0	0		0.55	0.77	1	1	0	0	0	0
Centr N	222	123	102	0		0.55	0.77	1	1	1408.87	1058.69	1094.36	3.17
WCVI N	294	559	0	598		0.55	0.77	1	1	288.86	678.92	2.77	950.19
J De F N	0	0	0	0		0.55	0.77	1	1	0	0	0	0
John St N	1	0	0	5		0.55	0.77	1	1	140.38	22.12	1.7	951.92
Fraser N	0	0	0	0		0.55	0.77	0.95	1	0	0	0	0
Geo St S	0	512	0	0		0.55	0.77	0.95	1	441.88	1442.13	3.61	1.45
Fishery	(2) 2003 shaker mortality (CCC file)					(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5				
Centr T	5	11	3	1		85462	187398	140079	53311				
Geo St T	7	14	2	0		85462	187398	140079	53311				
North N	0	0	0	0		85462	187398	64173	53047				
Centr N	16	6	0	0		85462	187398	64173	53047				
WCVI N	38	4	2	5		85462	187398	64173	53047				
J De F N	0	0	0	0		85462	187398	64173	53047				
John St N	0	0	0	0		85462	187398	64173	53047				
Fraser N	0	0	0	0		85462	187398	140079	53311				
Geo St S	631	733	59	8		85462	187398	140079	53311				
Fishery	(3) 2003 CNR mortality (CCC file)					(6) base period exploitation rates							
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5				
Centr T	406	940	460	105		0.003	0.025	0.061	0.042				
Geo St T	332	656	225	7		0.003	0.006	0.017	0				
North N	0	0	0	0		0	0	0	0				
Centr N	2111	1133	894	3		0.016	0.006	0.017	0				
WCVI N	0	0	0	0		0.003	0.004	0	0.018				
J De F N	0	0	0	0		0	0	0	0				
John St N	203	18	2	855		0.002	0	0	0.018				
Fraser N	0	0	0	0		0	0	0	0				
Geo St S	264	306	24	3		0.005	0.008	0	0				
(8) sum of AEQ total mortality =				9862.45									
(9) sum of cohort X AEQ BPER =				28010.36									
(10) Canada ISBM =				0.35									

**Table 2.4(d): Base period Exploitation Rates for Columbia Upriver Summers for Canadian Fisheries (Figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1913	3447	630	0	1598	3188	633	0	1279	2669	586	0	1302	2135	488
Geo St T	0	459	962	0	0	384	890	0	0	307	745	0	0	313	596	0
North N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centr N	2075	459	317	0	1655	384	293	0	1686	307	244	0	1941	313	202	0
WCVI N	402	306	0	236	320	256	0	237	326	205	0	219	376	208	0	181
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	134	0	0	236	107	0	0	237	109	0	0	219	125	0	0	181
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	535	612	0	0	427	511	0	0	435	409	0	0	95	413	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	418	230	72	12	311	181	66	12	357	160	56	11	399	159	45	9
Geo St T	501	27	17	2	358	21	16	1	352	16	13	1	374	16	11	1
North N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centr N	180	25	1	1	133	20	1	1	116	13	1	1	120	12	1	1
WCVI N	59	2	1	2	46	2	1	2	46	2	1	2	46	1	1	2
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	106	12	0	3	77	9	0	2	68	6	0	3	62	5	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	42	42	2	0	33	35	2	0	33	28	1	0	902	34	1	1

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
Geo St T	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
North N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
Centr N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
WCVI N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
J De F N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
John St N	74141	65141	18611	13284	59143	54430	17229	13346	60239	43567	14340	12323	69379	44357	11876	10216
Fraser N	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777
Geo St S	74141	65141	54714	15217	59143	54430	50606	15285	60239	43567	42372	14150	69379	44357	33895	11777

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.025	0.061	0.042	0.003	0.025	0.061	0.042	0.003	0.025	0.061	0.042	0.003	0.025	0.061	0.042
Geo St T	0.004	0.006	0.017	0	0.003	0.006	0.017	0	0.003	0.006	0.017	0	0.003	0.006	0.017	0
North N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centr N	0.017	0.006	0.017	0	0.017	0.006	0.017	0	0.016	0.006	0.017	0	0.016	0.006	0.017	0
WCVI N	0.003	0.004	0	0.018	0.003	0.004	0	0.018	0.003	0.004	0	0.018	0.003	0.004	0	0.018
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.002	0	0	0.018	0.002	0	0	0.018	0.002	0	0	0.018	0.001	0	0	0.018
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.004	0.008	0	0	0.004	0.008	0	0	0.004	0.008	0	0	0.008	0.008	0	0

### APPENDIX 3: CALCULATION OF PRESEASON ISBM INDEX FOR WASHINGTON AND OREGON COAST STOCK

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## Methods to calculate preseason ISBM Indices for the Washington and Oregon Coast

The preseason ISBM indices for Washington and Oregon coast stocks (Hoko, Grays Harbor, Queets, Hoh, Quillayute, Siletz, Siuslaw, Newhalem) are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input	output
<i>termER.xls</i>	spreadsheet	various	
ISBM cei file	Text file	Projected catch	
ChinookModel	VB.net program	ISBM cei file	ISBM ccc file
CalcISBM	VB.net program	ISBM ccc file	Model ISBM.xls

### Part 1: Update terminal harvest rates

Then update the terminal run and catch in *termER\_yyyy.xls* with the following data:

Oregon: Newhalem, Siletz, Siuslaw, ask Ethan Clemens, ODFW.

Greys: Table B-25 in PFMC “Ocean Review”

Queets: Table B-30 in PFMC “Ocean Review”

Quillayute: Table B-36 in PFMC “Ocean Review”

Hoh: Table B-33 in PFMC “Ocean Review”

Hoko: Check with the Makah tribe to confirm that the catch is still zero, since 1979.

### Part 2: calculate the ISBM index using external harvest rates in spreadsheet

Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER.xls* and write the ISBM indices to *model ISBM.xls* as follows:

- Make a copy of the chinook model calibration folder that was used to calculate the SRFI index because the cei file in this folder has the fp controls for the current year replaces with expected catch . Name the new folder “preseason ISBM”. This folder should have 2 files named SRFI.cei and SRFI.ccc. Rename the both as ISBM.cei and ISBM.ccc. Rename the p.op7 file as ISBMp.op7. Send a copy of ISBM.cei to Canada and ask if there are any changes to Canadian catch expectations.
- If you can not find a copy of the SRFI.cei and SRFI.ccc files, then modify a calibration cei file by replacing the fp controls for the most recent year with the expected catch and rename it as ISBM.cei. Make a copy of the p.op7 file and rename it ISBMp.op7. Open ISBMp.op7 and update the following items (from top to bottom)
  - prefix (e.g. ISBM),
  - name of CEI file e.g. ISBM.CEI
- Go to the folder named Run *calcISBM.vb* using the IDE (for an unexplained reason, the exe file does not work).
- Enter the year for the ISBM index.
- Click on “use external rates”. Select “yes”. The program will prompt you for “*termER\_yyyy.xls*”.
- Click on “file”. Select *ISBMp.op7* file.
- The program will ask you to “pick a stock”. Click on “done picking stocks”.
- The program will write the ISBM indices to a spreadsheet named “*model ISBM.xls*”.

Relationship between stock names and 3 letter acronyms when using the program named "calcISBM".		
Escapement Indicator stock name in Calibration and ERA report	Stock name in calcISBM.exe	External harvest rate
Hoko Grays Harbor Queets Hoh Quillayute	WCN	termER_yyyy.xls
Siletz Siuslaw Newhalem	ORC	termER_yyyy.xls



**Table 3.1(a): Data and computation flow for Hoko 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	799	0	0	0.61	0.81	0.95	1	279.11	675.86	54.94	7.5
PgtNth N	0	7	117	0	0.61	0.81	1	1	74.85	34.33	494.28	2.12
PgtSth N	0	0	0	0	0.61	0.81	1	1	0	0	0	0
Wash Cst N	206	1984	7965	2280	1	1	1	1	2029.44	3113.29	11290.37	3216.35
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	0	0	132	0	0.61	0.81	0.95	1	60.04	8.01	146.15	0.14
PgtNth S	0	129	0	0	0.61	0.81	0.95	1	129.87	530.5	0.14	0.32
PgtSth S	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
terminal S	0	0	0	0	1	1	1	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	366	223	46	6	43970	33372	30163	10082
PgtNth N	24	2	1	0	43970	33372	17598	8228
PgtSth N	0	0	0	0	43970	33372	17598	8228
Wash Cst N	999	190	68	11	7206	8839	17598	8228
terminal N	0	0	0	0	7206	8839	17598	8228
Wash Ocn S	67	7	10	0	43970	33372	30163	10082
PgtNth S	45	20	0	0	43970	33372	30163	10082
PgtSth S	0	0	0	0	43970	33372	30163	10082
terminal S	0	0	0	0	7206	8839	17598	8228

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.02	0.002	0.001
PgtNth N	0	0	0	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.282	0.352	0.642	0.391
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.001	0	0.005	0
PgtNth S	144	43	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Wash Cst N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal S	0	0	0	0	7206	8839	17598	8228	0	0	0	0

(8) sum of AEQ total mortality =	1702.86
(9) sum of cohort X AEQ BPER =	2498.17
(10) US ISBM =	0.68

**Table 3.1(b): Hoko base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	960	0	0	0	1032	0	0	0	931	0	0	0	873	0	0
PgtNth N	0	51	367	0	0	54	388	0	0	49	416	0	0	46	379	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	570	4149	8529	2104	515	4468	9017	2514	482	4029	9677	2640	500	3794	8820	3073
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	139	0	0	0	146	0	0	0	158	0	0	0	142	0
PgtNth S	85	960	0	0	77	1032	0	0	72	931	0	0	75	873	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1045	509	65	7	767	449	56	7	736	415	62	7	752	380	54	7
PgtNth N	238	20	10	1	253	26	10	2	201	20	14	2	189	17	11	2
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	3428	492	91	12	3130	536	97	15	2947	485	105	15	2951	442	92	17
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	200	17	11	0	176	18	12	0	168	17	12	0	162	14	11	0
PgtNth S	341	141	0	0	320	152	0	0	285	137	0	0	273	128	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
PgtSth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Wash Cst N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
terminal N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Wash Ocn S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtSth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
terminal S	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.021	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001
PgtNth N	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.281	0.352	0.642	0.391	0.284	0.353	0.642	0.391	0.285	0.353	0.642	0.391	0.277	0.351	0.641	0.391
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.1(c): Data and computation flow for Hoko 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	26	1	0.61	0.81	0.95	1	152.37	205.89	2165.27	76.68
Geo St T	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
North N	0	14	26	17	0.61	0.81	1	1	30.24	124.91	270.71	174.44
Centr N	16	10	0	0	0.61	0.81	1	1	161.24	94.23	0	0
WCVI N	27	209	0	0	0.61	0.81	1	1	46.46	268.66	0	0
J De F N	0	0	0	0	0.61	0.81	1	1	24.83	0.75	0	0
John St N	0	0	0	1	0.61	0.81	1	1	67.14	4.19	0.47	117.88
Fraser N	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
Geo St S	0	396	0	0	0.61	0.81	0.95	1	88.35	1181.77	0.78	0.27

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	3	2	1	0	43970	33372	30163	10082
Geo St T	0	0	0	0	43970	33372	30163	10082
North N	6	1	0	0	43970	33372	17598	8228
Centr N	8	1	0	0	43970	33372	17598	8228
WCVI N	20	1	0	0	43970	33372	17598	8228
J De F N	1	0	0	0	43970	33372	17598	8228
John St N	0	0	0	0	43970	33372	17598	8228
Fraser N	0	0	0	0	43970	33372	30163	10082
Geo St S	325	152	13	2	43970	33372	30163	10082

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	209	145	112	5	0.003	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0
North N	59	126	221	142	0.001	0.004	0.015	0.021
Centr N	221	95	0	0	0.004	0.003	0	0
WCVI N	0	0	0	0	0.001	0.008	0	0
J De F N	36	1	0	0	0.001	0	0	0
John St N	85	3	1	106	0.002	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0
Geo St S	135	63	5	1	0.002	0.035	0	0

(8) sum of AEQ total mortality =	2368.32
(9) sum of cohort X AEQ BPER =	5257.54
(10) Canada ISBM =	0.45

**Table 3.1(d): Hoko base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	253	2171	58	0	272	2294	69	0	245	2470	73	0	230	2228	78
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	253	206	115	0	272	218	137	0	245	234	144	0	230	213	168
Centr N	341	177	0	0	307	190	0	0	287	172	0	0	301	161	0	0
WCVI N	85	556	0	0	77	597	0	0	72	539	0	0	75	505	0	0
J De F N	28	0	0	0	26	0	0	0	24	0	0	0	25	0	0	0
John St N	114	0	0	77	102	0	0	91	96	0	0	96	100	0	0	112
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	2300	0	0	0	2471	0	0	0	2230	0	0	0	2069	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	494	175	44	2	415	176	46	2	437	178	51	2	444	162	45	2
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	104	7	0	0	81	7	0	0	86	7	0	0	86	6	0	0
Centr N	212	22	0	0	178	22	0	0	143	17	0	0	133	14	0	0
WCVI N	69	2	0	0	61	2	0	0	56	2	0	0	51	2	0	0
J De F N	54	2	0	0	45	2	0	0	44	2	0	0	46	1	0	0
John St N	125	10	0	1	103	10	0	1	84	8	0	1	69	6	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	159	1	0	5	170	1	0	4	154	1	0	998	150	1	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
North N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Centr N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
WCVI N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
J De F N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
John St N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Fraser N	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.006	0.072	0.008	0.003	0.006	0.072	0.008	0.004	0.006	0.072	0.008	0.004	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021
Centr N	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0	0.003	0.003	0	0
WCVI N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
J De F N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
John St N	0.002	0	0	0.014	0.002	0	0	0.014	0.001	0	0	0.014	0.001	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.035	0	0	0	0.035	0	0	0	0.035	0	0	0.008	0.035	0	0

**Table 3.2(a): Data and computation flow for Grays Harbor 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	799	0	0	0.61	0.81	0.95	1	279.11	675.86	54.94	7.5
PgtNth N	0	7	117	0	0.61	0.81	1	1	74.85	34.33	494.28	2.12
PgtSth N	0	0	0	0	0.61	0.81	1	1	0	0	0	0
Wash Cst N	206	1984	7965	2280	1	1	1	1	2029.44	3113.29	11290.37	3216.35
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	0	0	132	0	0.61	0.81	0.95	1	60.04	8.01	146.15	0.14
PgtNth S	0	129	0	0	0.61	0.81	0.95	1	129.87	530.5	0.14	0.32
PgtSth S	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
terminal S	0	0	0	0	1	1	1	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	366	223	46	6	43970	33372	30163	10082
PgtNth N	24	2	1	0	43970	33372	17598	8228
PgtSth N	0	0	0	0	43970	33372	17598	8228
Wash Cst N	999	190	68	11	7206	8839	17598	8228
terminal N	0	0	0	0	7206	8839	17598	8228
Wash Ocn S	67	7	10	0	43970	33372	30163	10082
PgtNth S	45	20	0	0	43970	33372	30163	10082
PgtSth S	0	0	0	0	43970	33372	30163	10082
terminal S	0	0	0	0	7206	8839	17598	8228

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.02	0.002	0.001
PgtNth N	0	0	0	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.282	0.352	0.642	0.391
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.001	0	0.005	0
PgtNth S	144	43	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Wash Cst N	0.23	0.23	0.23	0.23	7206	8839	17598	8228	1633.25	2003.53	3988.85	1864.95
terminal N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal S	0	0	0	0	7206	8839	17598	8228	0	0	0	0

(8) sum of AEQ total mortality =	11193.43
(9) sum of cohort X AEQ BPER =	22641.4
(10) US ISBM =	0.49

**Table 3.2(b): Grays Harbor base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	960	0	0	0	1032	0	0	0	931	0	0	0	873	0	0
PgtNth N	0	51	367	0	0	54	388	0	0	49	416	0	0	46	379	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	570	4149	8529	2104	515	4468	9017	2514	482	4029	9677	2640	500	3794	8820	3073
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	139	0	0	0	146	0	0	0	158	0	0	0	142	0
PgtNth S	85	960	0	0	77	1032	0	0	72	931	0	0	75	873	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1045	509	65	7	767	449	56	7	736	415	62	7	752	380	54	7
PgtNth N	238	20	10	1	253	26	10	2	201	20	14	2	189	17	11	2
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	3428	492	91	12	3130	536	97	15	2947	485	105	15	2951	442	92	17
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	200	17	11	0	176	18	12	0	168	17	12	0	162	14	11	0
PgtNth S	341	141	0	0	320	152	0	0	285	137	0	0	273	128	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
PgtSth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Wash Cst N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
terminal N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Wash Ocn S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtSth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
terminal S	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.021	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001
PgtNth N	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.281	0.352	0.642	0.391	0.284	0.353	0.642	0.391	0.285	0.353	0.642	0.391	0.277	0.351	0.641	0.391
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.2(c): Data and computation flow for Hoko 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	26	1	0.61	0.81	0.95	1	152.37	205.89	2165.27	76.68
Geo St T	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
North N	0	14	26	17	0.61	0.81	1	1	30.24	124.91	270.71	174.44
Centr N	16	10	0	0	0.61	0.81	1	1	161.24	94.23	0	0
WCVI N	27	209	0	0	0.61	0.81	1	1	46.46	268.66	0	0
J De F N	0	0	0	0	0.61	0.81	1	1	24.83	0.75	0	0
John St N	0	0	0	1	0.61	0.81	1	1	67.14	4.19	0.47	117.88
Fraser N	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
Geo St S	0	396	0	0	0.61	0.81	0.95	1	88.35	1181.77	0.78	0.27

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	3	2	1	0	43970	33372	30163	10082
Geo St T	0	0	0	0	43970	33372	30163	10082
North N	6	1	0	0	43970	33372	17598	8228
Centr N	8	1	0	0	43970	33372	17598	8228
WCVI N	20	1	0	0	43970	33372	17598	8228
J De F N	1	0	0	0	43970	33372	17598	8228
John St N	0	0	0	0	43970	33372	17598	8228
Fraser N	0	0	0	0	43970	33372	30163	10082
Geo St S	325	152	13	2	43970	33372	30163	10082

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	209	145	112	5	0.003	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0
North N	59	126	221	142	0.001	0.004	0.015	0.021
Centr N	221	95	0	0	0.004	0.003	0	0
WCVI N	0	0	0	0	0.001	0.008	0	0
J De F N	36	1	0	0	0.001	0	0	0
John St N	85	3	1	106	0.002	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0
Geo St S	135	63	5	1	0.002	0.035	0	0

(8) sum of AEQ total mortality =	2368.32
(9) sum of cohort X AEQ BPER =	5257.54
(10) Canada ISBM =	0.450

**Table 3.2(d): Garys Harbor Base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	253	2171	58	0	272	2294	69	0	245	2470	73	0	230	2228	78
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	253	206	115	0	272	218	137	0	245	234	144	0	230	213	168
Centr N	341	177	0	0	307	190	0	0	287	172	0	0	301	161	0	0
WCVI N	85	556	0	0	77	597	0	0	72	539	0	0	75	505	0	0
J De F N	28	0	0	0	26	0	0	0	24	0	0	0	25	0	0	0
John St N	114	0	0	77	102	0	0	91	96	0	0	96	100	0	0	112
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	2300	0	0	0	2471	0	0	0	2230	0	0	0	2069	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	494	175	44	2	415	176	46	2	437	178	51	2	444	162	45	2
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	104	7	0	0	81	7	0	0	86	7	0	0	86	6	0	0
Centr N	212	22	0	0	178	22	0	0	143	17	0	0	133	14	0	0
WCVI N	69	2	0	0	61	2	0	0	56	2	0	0	51	2	0	0
J De F N	54	2	0	0	45	2	0	0	44	2	0	0	46	1	0	0
John St N	125	10	0	1	103	10	0	1	84	8	0	1	69	6	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	159	1	0	5	170	1	0	4	154	1	0	998	150	1	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
North N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Centr N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
WCVI N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
J De F N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
John St N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Fraser N	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.006	0.072	0.008	0.003	0.006	0.072	0.008	0.004	0.006	0.072	0.008	0.004	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021
Centr N	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0	0.003	0.003	0	0
WCVI N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
J De F N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
John St N	0.002	0	0	0.014	0.002	0	0	0.014	0.001	0	0	0.014	0.001	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.035	0	0	0	0.035	0	0	0	0.035	0	0	0.008	0.035	0	0



**Table 3.3(a): Data and computation flow for Queets 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years					(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5
WA/OR T	0	799	0	0	0.61	0.81	0.95	1	1	279.11	675.86	54.94	7.5
PgtNth N	0	7	117	0	0.61	0.81	1	1	1	74.85	34.33	494.28	2.12
PgtSth N	0	0	0	0	0.61	0.81	1	1	1	0	0	0	0
Wash Cst N	206	1984	7965	2280	1	1	1	1	1	2029.44	3113.29	11290.37	3216.35
terminal N	0	0	0	0	1	1	1	1	1	0	0	0	0
Wash Ocn S	0	0	132	0	0.61	0.81	0.95	1	1	60.04	8.01	146.15	0.14
PgtNth S	0	129	0	0	0.61	0.81	0.95	1	1	129.87	530.5	0.14	0.32
PgtSth S	0	0	0	0	0.61	0.81	0.95	1	1	0	0	0	0
terminal S	0	0	0	0	1	1	1	1	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	366	223	46	6	43970	33372	30163	10082
PgtNth N	24	2	1	0	43970	33372	17598	8228
PgtSth N	0	0	0	0	43970	33372	17598	8228
Wash Cst N	999	190	68	11	7206	8839	17598	8228
terminal N	0	0	0	0	7206	8839	17598	8228
Wash Ocn S	67	7	10	0	43970	33372	30163	10082
PgtNth S	45	20	0	0	43970	33372	30163	10082
PgtSth S	0	0	0	0	43970	33372	30163	10082
terminal S	0	0	0	0	7206	8839	17598	8228

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.02	0.002	0.001
PgtNth N	0	0	0	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.282	0.352	0.642	0.391
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.001	0	0.005	0
PgtNth S	144	43	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Wash Cst N	0.4	0.4	0.4	0.4	7206	8839	17598	8228	2882.2	3535.64	7039.15	3291.08
terminal N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal S	0	0	0	0	7206	8839	17598	8228	0	0	0	0

(8) sum of AEQ total mortality =	18450.94
(9) sum of cohort X AEQ BPER =	17358.93
(10) US ISBM =	1.06

**Table 3.3(b): Queets base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	960	0	0	0	1032	0	0	0	931	0	0	0	873	0	0
PgtNth N	0	51	367	0	0	54	388	0	0	49	416	0	0	46	379	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	570	4149	8529	2104	515	4468	9017	2514	482	4029	9677	2640	500	3794	8820	3073
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	139	0	0	0	146	0	0	0	158	0	0	0	142	0
PgtNth S	85	960	0	0	77	1032	0	0	72	931	0	0	75	873	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1045	509	65	7	767	449	56	7	736	415	62	7	752	380	54	7
PgtNth N	238	20	10	1	253	26	10	2	201	20	14	2	189	17	11	2
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	3428	492	91	12	3130	536	97	15	2947	485	105	15	2951	442	92	17
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	200	17	11	0	176	18	12	0	168	17	12	0	162	14	11	0
PgtNth S	341	141	0	0	320	152	0	0	285	137	0	0	273	128	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
PgtSth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Wash Cst N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
terminal N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Wash Ocn S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtSth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
terminal S	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.021	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001
PgtNth N	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.281	0.352	0.642	0.391	0.284	0.353	0.642	0.391	0.285	0.353	0.642	0.391	0.277	0.351	0.641	0.391
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.3(c): Data and computation flow for Queets 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	26	1	0.61	0.81	0.95	1	152.37	205.89	2165.27	76.68
Geo St T	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
North N	0	14	26	17	0.61	0.81	1	1	30.24	124.91	270.71	174.44
Centr N	16	10	0	0	0.61	0.81	1	1	161.24	94.23	0	0
WCVI N	27	209	0	0	0.61	0.81	1	1	46.46	268.66	0	0
J De F N	0	0	0	0	0.61	0.81	1	1	24.83	0.75	0	0
John St N	0	0	0	1	0.61	0.81	1	1	67.14	4.19	0.47	117.88
Fraser N	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
Geo St S	0	396	0	0	0.61	0.81	0.95	1	88.35	1181.77	0.78	0.27

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	3	2	1	0	43970	33372	30163	10082
Geo St T	0	0	0	0	43970	33372	30163	10082
North N	6	1	0	0	43970	33372	17598	8228
Centr N	8	1	0	0	43970	33372	17598	8228
WCVI N	20	1	0	0	43970	33372	17598	8228
J De F N	1	0	0	0	43970	33372	17598	8228
John St N	0	0	0	0	43970	33372	17598	8228
Fraser N	0	0	0	0	43970	33372	30163	10082
Geo St S	325	152	13	2	43970	33372	30163	10082

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	209	145	112	5	0.003	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0
North N	59	126	221	142	0.001	0.004	0.015	0.021
Centr N	221	95	0	0	0.004	0.003	0	0
WCVI N	0	0	0	0	0.001	0.008	0	0
J De F N	36	1	0	0	0.001	0	0	0
John St N	85	3	1	106	0.002	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0
Geo St S	135	63	5	1	0.002	0.035	0	0

(8) sum of AEQ total mortality =	2368.32
(9) sum of cohort X AEQ BPER =	5257.54
(10) Canada ISBM =	0.45

**Table 3.3(d): Queets base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	253	2171	58	0	272	2294	69	0	245	2470	73	0	230	2228	78
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	253	206	115	0	272	218	137	0	245	234	144	0	230	213	168
Centr N	341	177	0	0	307	190	0	0	287	172	0	0	301	161	0	0
WCVI N	85	556	0	0	77	597	0	0	72	539	0	0	75	505	0	0
J De F N	28	0	0	0	26	0	0	0	24	0	0	0	25	0	0	0
John St N	114	0	0	77	102	0	0	91	96	0	0	96	100	0	0	112
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	2300	0	0	0	2471	0	0	0	2230	0	0	0	2069	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	494	175	44	2	415	176	46	2	437	178	51	2	444	162	45	2
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	104	7	0	0	81	7	0	0	86	7	0	0	86	6	0	0
Centr N	212	22	0	0	178	22	0	0	143	17	0	0	133	14	0	0
WCVI N	69	2	0	0	61	2	0	0	56	2	0	0	51	2	0	0
J De F N	54	2	0	0	45	2	0	0	44	2	0	0	46	1	0	0
John St N	125	10	0	1	103	10	0	1	84	8	0	1	69	6	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	159	1	0	5	170	1	0	4	154	1	0	998	150	1	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
North N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Centr N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
WCVI N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
J De F N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
John St N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Fraser N	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.006	0.072	0.008	0.003	0.006	0.072	0.008	0.004	0.006	0.072	0.008	0.004	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021
Centr N	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0	0.003	0.003	0	0
WCVI N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
J De F N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
John St N	0.002	0	0	0.014	0.002	0	0	0.014	0.001	0	0	0.014	0.001	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.035	0	0	0	0.035	0	0	0	0.035	0	0	0.008	0.035	0	0

**Table 3.4(a): Data and computation flow for Hoh 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	799	0	0	0.61	0.81	0.95	1	279.11	675.86	54.94	7.5
PgtNth N	0	7	117	0	0.61	0.81	1	1	74.85	34.33	494.28	2.12
PgtSth N	0	0	0	0	0.61	0.81	1	1	0	0	0	0
Wash Cst N	206	1984	7965	2280	1	1	1	1	2029.44	3113.29	11290.37	3216.35
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	0	0	132	0	0.61	0.81	0.95	1	60.04	8.01	146.15	0.14
PgtNth S	0	129	0	0	0.61	0.81	0.95	1	129.87	530.5	0.14	0.32
PgtSth S	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
terminal S	0	0	0	0	1	1	1	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	366	223	46	6	43970	33372	30163	10082
PgtNth N	24	2	1	0	43970	33372	17598	8228
PgtSth N	0	0	0	0	43970	33372	17598	8228
Wash Cst N	999	190	68	11	7206	8839	17598	8228
terminal N	0	0	0	0	7206	8839	17598	8228
Wash Ocn S	67	7	10	0	43970	33372	30163	10082
PgtNth S	45	20	0	0	43970	33372	30163	10082
PgtSth S	0	0	0	0	43970	33372	30163	10082
terminal S	0	0	0	0	7206	8839	17598	8228

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.02	0.002	0.001
PgtNth N	0	0	0	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.282	0.352	0.642	0.391
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.001	0	0.005	0
PgtNth S	144	43	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Wash Cst N	0.3	0.3	0.3	0.3	7206	8839	17598	8228	2163.56	2654.07	5284.02	2470.49
terminal N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal S	0	0	0	0	7206	8839	17598	8228	0	0	0	0

(8) sum of AEQ total mortality =	14274.99
(9) sum of cohort X AEQ BPER =	11821.58
(10) US ISBM =	1.21

**Table 3.4(b): Hoh base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	960	0	0	0	1032	0	0	0	931	0	0	0	873	0	0
PgtNth N	0	51	367	0	0	54	388	0	0	49	416	0	0	46	379	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	570	4149	8529	2104	515	4468	9017	2514	482	4029	9677	2640	500	3794	8820	3073
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	139	0	0	0	146	0	0	0	158	0	0	0	142	0
PgtNth S	85	960	0	0	77	1032	0	0	72	931	0	0	75	873	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1045	509	65	7	767	449	56	7	736	415	62	7	752	380	54	7
PgtNth N	238	20	10	1	253	26	10	2	201	20	14	2	189	17	11	2
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	3428	492	91	12	3130	536	97	15	2947	485	105	15	2951	442	92	17
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	200	17	11	0	176	18	12	0	168	17	12	0	162	14	11	0
PgtNth S	341	141	0	0	320	152	0	0	285	137	0	0	273	128	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
PgtSth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Wash Cst N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
terminal N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Wash Ocn S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtSth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
terminal S	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.021	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001
PgtNth N	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.281	0.352	0.642	0.391	0.284	0.353	0.642	0.391	0.285	0.353	0.642	0.391	0.277	0.351	0.641	0.391
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.4(c): Data and computation flow for Hoh 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	26	1	0.61	0.81	0.95	1	152.37	205.89	2165.27	76.68
Geo St T	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
North N	0	14	26	17	0.61	0.81	1	1	30.24	124.91	270.71	174.44
Centr N	16	10	0	0	0.61	0.81	1	1	161.24	94.23	0	0
WCVI N	27	209	0	0	0.61	0.81	1	1	46.46	268.66	0	0
J De F N	0	0	0	0	0.61	0.81	1	1	24.83	0.75	0	0
John St N	0	0	0	1	0.61	0.81	1	1	67.14	4.19	0.47	117.88
Fraser N	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
Geo St S	0	396	0	0	0.61	0.81	0.95	1	88.35	1181.77	0.78	0.27
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	3	2	1	0	43970	33372	30163	10082				
Geo St T	0	0	0	0	43970	33372	30163	10082				
North N	6	1	0	0	43970	33372	17598	8228				
Centr N	8	1	0	0	43970	33372	17598	8228				
WCVI N	20	1	0	0	43970	33372	17598	8228				
J De F N	1	0	0	0	43970	33372	17598	8228				
John St N	0	0	0	0	43970	33372	17598	8228				
Fraser N	0	0	0	0	43970	33372	30163	10082				
Geo St S	325	152	13	2	43970	33372	30163	10082				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	209	145	112	5	0.003	0.006	0.072	0.008				
Geo St T	0	0	0	0	0	0	0	0				
North N	59	126	221	142	0.001	0.004	0.015	0.021				
Centr N	221	95	0	0	0.004	0.003	0	0				
WCVI N	0	0	0	0	0.001	0.008	0	0				
J De F N	36	1	0	0	0.001	0	0	0				
John St N	85	3	1	106	0.002	0	0	0.014				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	135	63	5	1	0.002	0.035	0	0				
(8) sum of AEQ total mortality =				2368.32								
(9) sum of cohort X AEQ BPER =				5257.54								
(10) Canada ISBM =				0.45								

**Table 3.4(d): Hoh base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	253	2171	58	0	272	2294	69	0	245	2470	73	0	230	2228	78
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	253	206	115	0	272	218	137	0	245	234	144	0	230	213	168
Centr N	341	177	0	0	307	190	0	0	287	172	0	0	301	161	0	0
WCVI N	85	556	0	0	77	597	0	0	72	539	0	0	75	505	0	0
J De F N	28	0	0	0	26	0	0	0	24	0	0	0	25	0	0	0
John St N	114	0	0	77	102	0	0	91	96	0	0	96	100	0	0	112
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	2300	0	0	0	2471	0	0	0	2230	0	0	0	2069	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	494	175	44	2	415	176	46	2	437	178	51	2	444	162	45	2
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	104	7	0	0	81	7	0	0	86	7	0	0	86	6	0	0
Centr N	212	22	0	0	178	22	0	0	143	17	0	0	133	14	0	0
WCVI N	69	2	0	0	61	2	0	0	56	2	0	0	51	2	0	0
J De F N	54	2	0	0	45	2	0	0	44	2	0	0	46	1	0	0
John St N	125	10	0	1	103	10	0	1	84	8	0	1	69	6	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	159	1	0	5	170	1	0	4	154	1	0	998	150	1	1
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
North N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Centr N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
WCVI N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
J De F N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
John St N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Fraser N	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.006	0.072	0.008	0.003	0.006	0.072	0.008	0.004	0.006	0.072	0.008	0.004	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021
Centr N	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0	0.003	0.003	0	0
WCVI N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
J De F N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
John St N	0.002	0	0	0.014	0.002	0	0	0.014	0.001	0	0	0.014	0.001	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.035	0	0	0	0.035	0	0	0	0.035	0	0	0.008	0.035	0	0



**Table 3.5(a): Data and computation flow for Quillayute 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	799	0	0	0.61	0.81	0.95	1	279.11	675.86	54.94	7.5
PgtNth N	0	7	117	0	0.61	0.81	1	1	74.85	34.33	494.28	2.12
PgtSth N	0	0	0	0	0.61	0.81	1	1	0	0	0	0
Wash Cst N	206	1984	7965	2280	1	1	1	1	2029.44	3113.29	11290.37	3216.35
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	0	0	132	0	0.61	0.81	0.95	1	60.04	8.01	146.15	0.14
PgtNth S	0	129	0	0	0.61	0.81	0.95	1	129.87	530.5	0.14	0.32
PgtSth S	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
terminal S	0	0	0	0	1	1	1	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	366	223	46	6	43970	33372	30163	10082				
PgtNth N	24	2	1	0	43970	33372	17598	8228				
PgtSth N	0	0	0	0	43970	33372	17598	8228				
Wash Cst N	999	190	68	11	7206	8839	17598	8228				
terminal N	0	0	0	0	7206	8839	17598	8228				
Wash Ocn S	67	7	10	0	43970	33372	30163	10082				
PgtNth S	45	20	0	0	43970	33372	30163	10082				
PgtSth S	0	0	0	0	43970	33372	30163	10082				
terminal S	0	0	0	0	7206	8839	17598	8228				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.006	0.02	0.002	0.001				
PgtNth N	0	0	0	0	0.002	0.001	0.028	0				
PgtSth N	0	0	0	0	0	0	0	0				
Wash Cst N	0	0	0	0	0.282	0.352	0.642	0.391				
terminal N	0	0	0	0	0	0	0	0				
Wash Ocn S	0	0	0	0	0.001	0	0.005	0				
PgtNth S	144	43	0	0	0.003	0.016	0	0				
PgtSth S	0	0	0	0	0	0	0	0				
terminal S	0	0	0	0	0	0	0	0				
For the fisheries (below) with external AEQ harvest rates, the base period exploitation rates shown above are from external AEQ harvest rates and a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs												
fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Wash Cst N	0.34	0.34	0.34	0.34	7206	8839	17598	8228	2477.55	3039.25	6050.88	2829.02
terminal N	0	0	0	0	7206	8839	17598	8228	0	0	0	0
terminal S	0	0	0	0	7206	8839	17598	8228	0	0	0	0
(8) sum of AEQ total mortality =				16099.56								
(9) sum of cohort X AEQ BPER =				12457.92								
(10) US ISBM =				1.29								

**Table 3.5(b): Quillayute base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	960	0	0	0	1032	0	0	0	931	0	0	0	873	0	0
PgtNth N	0	51	367	0	0	54	388	0	0	49	416	0	0	46	379	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	570	4149	8529	2104	515	4468	9017	2514	482	4029	9677	2640	500	3794	8820	3073
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	139	0	0	0	146	0	0	0	158	0	0	0	142	0
PgtNth S	85	960	0	0	77	1032	0	0	72	931	0	0	75	873	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1045	509	65	7	767	449	56	7	736	415	62	7	752	380	54	7
PgtNth N	238	20	10	1	253	26	10	2	201	20	14	2	189	17	11	2
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	3428	492	91	12	3130	536	97	15	2947	485	105	15	2951	442	92	17
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	200	17	11	0	176	18	12	0	168	17	12	0	162	14	11	0
PgtNth S	341	141	0	0	320	152	0	0	285	137	0	0	273	128	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
PgtSth N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Wash Cst N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
terminal N	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Wash Ocn S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtNth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
PgtSth S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
terminal S	14227	13180	13435	5413	12843	14192	14205	6467	12032	12798	15244	6792	12471	12052	13894	7907
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.007	0.021	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001	0.006	0.02	0.002	0.001
PgtNth N	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0	0.002	0.001	0.028	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.281	0.352	0.642	0.391	0.284	0.353	0.642	0.391	0.285	0.353	0.642	0.391	0.277	0.351	0.641	0.391
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0	0.003	0.016	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.5(c): Data and computation flow for Quillayute 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1	26	1	0.61	0.81	0.95	1	152.37	205.89	2165.27	76.68
Geo St T	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
North N	0	14	26	17	0.61	0.81	1	1	30.24	124.91	270.71	174.44
Centr N	16	10	0	0	0.61	0.81	1	1	161.24	94.23	0	0
WCVI N	27	209	0	0	0.61	0.81	1	1	46.46	268.66	0	0
J De F N	0	0	0	0	0.61	0.81	1	1	24.83	0.75	0	0
John St N	0	0	0	1	0.61	0.81	1	1	67.14	4.19	0.47	117.88
Fraser N	0	0	0	0	0.61	0.81	0.95	1	0	0	0	0
Geo St S	0	396	0	0	0.61	0.81	0.95	1	88.35	1181.77	0.78	0.27
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	3	2	1	0	43970	33372	30163	10082				
Geo St T	0	0	0	0	43970	33372	30163	10082				
North N	6	1	0	0	43970	33372	17598	8228				
Centr N	8	1	0	0	43970	33372	17598	8228				
WCVI N	20	1	0	0	43970	33372	17598	8228				
J De F N	1	0	0	0	43970	33372	17598	8228				
John St N	0	0	0	0	43970	33372	17598	8228				
Fraser N	0	0	0	0	43970	33372	30163	10082				
Geo St S	325	152	13	2	43970	33372	30163	10082				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	209	145	112	5	0.003	0.006	0.072	0.008				
Geo St T	0	0	0	0	0	0	0	0				
North N	59	126	221	142	0.001	0.004	0.015	0.021				
Centr N	221	95	0	0	0.004	0.003	0	0				
WCVI N	0	0	0	0	0.001	0.008	0	0				
J De F N	36	1	0	0	0.001	0	0	0				
John St N	85	3	1	106	0.002	0	0	0.014				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	135	63	5	1	0.002	0.035	0	0				
(8) sum of AEQ total mortality =				2368.32								
(9) sum of cohort X AEQ BPER =				5257.54								
(10) Canada ISBM =				0.45								

**Table 3.5(d): Quillayutes base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	253	2171	58	0	272	2294	69	0	245	2470	73	0	230	2228	78
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	253	206	115	0	272	218	137	0	245	234	144	0	230	213	168
Centr N	341	177	0	0	307	190	0	0	287	172	0	0	301	161	0	0
WCVI N	85	556	0	0	77	597	0	0	72	539	0	0	75	505	0	0
J De F N	28	0	0	0	26	0	0	0	24	0	0	0	25	0	0	0
John St N	114	0	0	77	102	0	0	91	96	0	0	96	100	0	0	112
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	2300	0	0	0	2471	0	0	0	2230	0	0	0	2069	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	494	175	44	2	415	176	46	2	437	178	51	2	444	162	45	2
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	104	7	0	0	81	7	0	0	86	7	0	0	86	6	0	0
Centr N	212	22	0	0	178	22	0	0	143	17	0	0	133	14	0	0
WCVI N	69	2	0	0	61	2	0	0	56	2	0	0	51	2	0	0
J De F N	54	2	0	0	45	2	0	0	44	2	0	0	46	1	0	0
John St N	125	10	0	1	103	10	0	1	84	8	0	1	69	6	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	6	159	1	0	5	170	1	0	4	154	1	0	998	150	1	1

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St T	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
North N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Centr N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
WCVI N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
J De F N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
John St N	87572	56392	13435	5413	78842	60583	14205	6467	73884	54692	15244	6792	77285	51236	13894	7907
Fraser N	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557
Geo St S	87572	56392	29441	7792	78842	60583	31106	9304	73884	54692	33494	9838	77285	51236	30205	10557

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.006	0.072	0.008	0.003	0.006	0.072	0.008	0.004	0.006	0.072	0.008	0.004	0.006	0.072	0.008
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021	0.001	0.004	0.015	0.021
Centr N	0.004	0.003	0	0	0.004	0.003	0	0	0.004	0.003	0	0	0.003	0.003	0	0
WCVI N	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0	0.001	0.008	0	0
J De F N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
John St N	0.002	0	0	0.014	0.002	0	0	0.014	0.001	0	0	0.014	0.001	0	0	0.014
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0.035	0	0	0	0.035	0	0	0	0.035	0	0	0.008	0.035	0	0

**Table 3.6(a): Data and computation flow for Niehalem 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1352	334	150	0.57	0.77	0.93	1	1384.29	1476.67	470.18	168.49
PgtNth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
PgtSth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
Wash Cst N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	749	462	1049	0	0.57	0.77	0.93	1	808.63	445.81	1149.88	1.1
PgtNth S	0	0	0	0	0.57	0.77	0.93	1	910.75	3.58	0.6	2.5
PgtSth S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal S	4710	3178	9526	12697	1	1	1	1	1857.96	1252.13	3880.29	5145.18
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	1862	757	213	52	223652	118649	133178	80668				
PgtNth N	0	0	0	0	223652	118649	49845	66093				
PgtSth N	0	0	0	0	223652	118649	49845	66093				
Wash Cst N	0	0	0	0	223652	118649	133178	80668				
terminal N	0	0	0	0	23867	16084	49845	66093				
Wash Ocn S	393	56	77	1	223652	118649	133178	80668				
PgtNth S	0	0	0	0	223652	118649	133178	80668				
PgtSth S	0	0	0	0	223652	118649	133178	80668				
terminal S	370	220	657	876	23867	16084	49845	66093				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.006	0.012	0.004	0.002				
PgtNth N	0	0	0	0	0	0	0	0				
PgtSth N	0	0	0	0	0	0	0	0				
Wash Cst N	0	0	0	0	0	0	0	0				
terminal N	0	0	0	0	0	0	0	0				
Wash Ocn S	0	0	0	0	0.004	0.004	0.009	0				
PgtNth S	0	0	0	0	0.004	0	0	0				
PgtSth S	0	0	0	0	0	0	0	0				
terminal S	0	0	0	0	0.078	0.078	0.078	0.078				
For the fisheries (below) with external AEQ harvest rates, the base period exploitation rates shown above are from external AEQ harvest rates and a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs												
fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal S	0.25	0.25	0.25	0.25	23867	16084	49845	66093	5966.67	4021.08	12461.17	16523.23
(8) sum of AEQ total mortality =				44471.84								
(9) sum of cohort X AEQ BPER =				18958.06								
(10) US ISBM =				2.35								

**Table 3.6(b): Niehalem base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1073	189	75	0	1031	143	47	0	955	135	36	0	1491	132	29
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	787	555	896	0	611	533	680	0	886	494	642	0	1029	771	626	0
PgtNth S	599	0	0	0	466	0	0	0	675	0	0	0	784	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	16992	5025	7739	6575	5685	5281	5873	4119	2865	3739	6334	3094	5076	3555	5686	2742
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	2606	1176	236	50	1650	924	146	26	2449	877	142	20	2778	1337	135	16
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	554	79	67	1	422	75	51	0	620	70	48	0	670	104	46	0
PgtNth S	907	5	1	2	732	5	0	1	1012	5	0	1	1083	6	0	1
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	1386	347	534	454	463	365	405	284	234	258	437	213	410	246	392	189
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
PgtSth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Wash Cst N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal N	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Wash Ocn S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtSth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal S	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.008	0.014	0.004	0.002	0.006	0.012	0.003	0.002	0.005	0.012	0.003	0.002	0.005	0.012	0.003	0.002
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.004	0.004	0.009	0	0.004	0.004	0.009	0	0.003	0.004	0.009	0	0.003	0.004	0.009	0
PgtNth S	0.005	0	0	0	0.004	0	0	0	0.004	0	0	0	0.004	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205

**Table 3.6(c): Data and computation flow for Niehalem 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	8	10	3	0.57	0.77	0.93	1	749.7	1104.53	832.68	224.02
Geo St T	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
North N	0	0	66	193	0.57	0.77	1	1	0	0	694.02	2020
Centr N	86	6	16	0	0.57	0.77	1	1	827.49	83.36	175.31	3.95
WCVI N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
J De F N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
John St N	1	0	0	0	0.57	0.77	1	1	228.59	14.45	0	0
Fraser N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
Geo St S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	14	7	1	0	223652	118649	133178	80668				
Geo St T	0	0	0	0	223652	118649	133178	80668				
North N	0	0	0	0	223652	118649	49845	66093				
Centr N	42	4	0	0	223652	118649	49845	66093				
WCVI N	0	0	0	0	223652	118649	49845	66093				
J De F N	0	0	0	0	223652	118649	49845	66093				
John St N	1	0	0	0	223652	118649	49845	66093				
Fraser N	0	0	0	0	223652	118649	133178	80668				
Geo St S	0	0	0	0	223652	118649	133178	80668				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1062	528	126	19	0.003	0.009	0.006	0.003				
Geo St T	0	0	0	0	0	0	0	0				
North N	0	0	566	1646	0	0	0.014	0.031				
Centr N	1164	89	143	4	0.004	0.001	0.004	0				
WCVI N	0	0	0	0	0	0	0	0				
J De F N	0	0	0	0	0	0	0	0				
John St N	273	12	0	0	0.001	0	0	0				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	0	0	0	0	0	0	0	0				
(8) sum of AEQ total mortality =				4795.4								
(9) sum of cohort X AEQ BPER =				6958.09								
(10) Canada ISBM =				0.69								

**Table 3.6(d): Niehalem base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1147	660	150	0	1102	501	94	0	1021	473	71	0	1594	461	58
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	563	1046	0	0	427	655	0	0	461	492	0	0	414	436
Centr N	899	74	141	0	699	71	107	0	1012	66	115	0	1176	103	103	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	112	0	0	0	87	0	0	0	127	0	0	0	147	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1232	420	37	8	893	378	27	5	1455	392	27	4	1642	594	26	3
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Centr N	529	51	2	2	382	46	1	1	474	36	1	1	492	51	1	1
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	311	24	0	0	221	21	0	0	278	17	0	0	257	21	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
North N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Centr N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
WCVI N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
J De F N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
John St N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Fraser N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.004	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031
Centr N	0.004	0.001	0.004	0	0.004	0.001	0.004	0	0.003	0.001	0.004	0	0.003	0.001	0.004	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



**Table 3.7(a): Data and computation flow for Siletz 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1352	334	150	0.57	0.77	0.93	1	1384.29	1476.67	470.18	168.49
PgtNth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
PgtSth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
Wash Cst N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	749	462	1049	0	0.57	0.77	0.93	1	808.63	445.81	1149.88	1.1
PgtNth S	0	0	0	0	0.57	0.77	0.93	1	910.75	3.58	0.6	2.5
PgtSth S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal S	4710	3178	9526	12697	1	1	1	1	1857.96	1252.13	3880.29	5145.18

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1862	757	213	52	223652	118649	133178	80668
PgtNth N	0	0	0	0	223652	118649	49845	66093
PgtSth N	0	0	0	0	223652	118649	49845	66093
Wash Cst N	0	0	0	0	223652	118649	133178	80668
terminal N	0	0	0	0	23867	16084	49845	66093
Wash Ocn S	393	56	77	1	223652	118649	133178	80668
PgtNth S	0	0	0	0	223652	118649	133178	80668
PgtSth S	0	0	0	0	223652	118649	133178	80668
terminal S	370	220	657	876	23867	16084	49845	66093

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.012	0.004	0.002
PgtNth N	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.004	0.004	0.009	0
PgtNth S	0	0	0	0	0.004	0	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0.078	0.078	0.078	0.078

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal S	0.34	0.34	0.34	0.34	23867	16084	49845	66093	8114.67	5468.67	16947.19	22471.6

(8) sum of AEQ total mortality =	58501.81
(9) sum of cohort X AEQ BPER =	44939.7
(10) US ISBM =	1.3

**Table 3.7(b): Siletz base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1073	189	75	0	1031	143	47	0	955	135	36	0	1491	132	29
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	787	555	896	0	611	533	680	0	886	494	642	0	1029	771	626	0
PgtNth S	599	0	0	0	466	0	0	0	675	0	0	0	784	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	16992	5025	7739	6575	5685	5281	5873	4119	2865	3739	6334	3094	5076	3555	5686	2742
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	2606	1176	236	50	1650	924	146	26	2449	877	142	20	2778	1337	135	16
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	554	79	67	1	422	75	51	0	620	70	48	0	670	104	46	0
PgtNth S	907	5	1	2	732	5	0	1	1012	5	0	1	1083	6	0	1
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	1386	347	534	454	463	365	405	284	234	258	437	213	410	246	392	189
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
PgtSth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Wash Cst N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal N	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Wash Ocn S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtSth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal S	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.008	0.014	0.004	0.002	0.006	0.012	0.003	0.002	0.005	0.012	0.003	0.002	0.005	0.012	0.003	0.002
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.004	0.004	0.009	0	0.004	0.004	0.009	0	0.003	0.004	0.009	0	0.003	0.004	0.009	0
PgtNth S	0.005	0	0	0	0.004	0	0	0	0.004	0	0	0	0.004	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205

**Table 3.7(c): Data and computation flow for Siletz 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	8	10	3	0.57	0.77	0.93	1	749.7	1104.53	832.68	224.02
Geo St T	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
North N	0	0	66	193	0.57	0.77	1	1	0	0	694.02	2020
Centr N	86	6	16	0	0.57	0.77	1	1	827.49	83.36	175.31	3.95
WCVI N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
J De F N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
John St N	1	0	0	0	0.57	0.77	1	1	228.59	14.45	0	0
Fraser N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
Geo St S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	14	7	1	0	223652	118649	133178	80668				
Geo St T	0	0	0	0	223652	118649	133178	80668				
North N	0	0	0	0	223652	118649	49845	66093				
Centr N	42	4	0	0	223652	118649	49845	66093				
WCVI N	0	0	0	0	223652	118649	49845	66093				
J De F N	0	0	0	0	223652	118649	49845	66093				
John St N	1	0	0	0	223652	118649	49845	66093				
Fraser N	0	0	0	0	223652	118649	133178	80668				
Geo St S	0	0	0	0	223652	118649	133178	80668				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1062	528	126	19	0.003	0.009	0.006	0.003				
Geo St T	0	0	0	0	0	0	0	0				
North N	0	0	566	1646	0	0	0.014	0.031				
Centr N	1164	89	143	4	0.004	0.001	0.004	0				
WCVI N	0	0	0	0	0	0	0	0				
J De F N	0	0	0	0	0	0	0	0				
John St N	273	12	0	0	0.001	0	0	0				
Fraser N	0	0	0	0	0	0	0	0				
Geo St S	0	0	0	0	0	0	0	0				
(8) sum of AEQ total mortality =				4795.4								
(9) sum of cohort X AEQ BPER =				6958.09								
(10) Canada ISBM =				0.69								

**Table 3.7(d): Siletz base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1147	660	150	0	1102	501	94	0	1021	473	71	0	1594	461	58
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	563	1046	0	0	427	655	0	0	461	492	0	0	414	436
Centr N	899	74	141	0	699	71	107	0	1012	66	115	0	1176	103	103	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	112	0	0	0	87	0	0	0	127	0	0	0	147	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1232	420	37	8	893	378	27	5	1455	392	27	4	1642	594	26	3
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Centr N	529	51	2	2	382	46	1	1	474	36	1	1	492	51	1	1
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	311	24	0	0	221	21	0	0	278	17	0	0	257	21	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
North N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Centr N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
WCVI N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
J De F N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
John St N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Fraser N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.004	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031
Centr N	0.004	0.001	0.004	0	0.004	0.001	0.004	0	0.003	0.001	0.004	0	0.003	0.001	0.004	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Table 3.8(a): Data and computation flow for Siuslaw 2003 preseason US ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1352	334	150	0.57	0.77	0.93	1	1384.29	1476.67	470.18	168.49
PgtNth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
PgtSth N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
Wash Cst N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
Wash Ocn S	749	462	1049	0	0.57	0.77	0.93	1	808.63	445.81	1149.88	1.1
PgtNth S	0	0	0	0	0.57	0.77	0.93	1	910.75	3.58	0.6	2.5
PgtSth S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
terminal S	4710	3178	9526	12697	1	1	1	1	1857.96	1252.13	3880.29	5145.18

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1862	757	213	52	223652	118649	133178	80668
PgtNth N	0	0	0	0	223652	118649	49845	66093
PgtSth N	0	0	0	0	223652	118649	49845	66093
Wash Cst N	0	0	0	0	223652	118649	133178	80668
terminal N	0	0	0	0	23867	16084	49845	66093
Wash Ocn S	393	56	77	1	223652	118649	133178	80668
PgtNth S	0	0	0	0	223652	118649	133178	80668
PgtSth S	0	0	0	0	223652	118649	133178	80668
terminal S	370	220	657	876	23867	16084	49845	66093

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.006	0.012	0.004	0.002
PgtNth N	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	0	0	0.004	0.004	0.009	0
PgtNth S	0	0	0	0	0.004	0	0	0
PgtSth S	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	0.078	0.078	0.078	0.078

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal S	0.26	0.26	0.26	0.26	23867	16084	49845	66093	6205.33	4181.93	12959.61	17184.16

(8) sum of AEQ total mortality =	46030.72
(9) sum of cohort X AEQ BPER =	16117.13
(10) US ISBM =	2.86

**Table 3.8(b): Siuslaw base period Exploitation rates in US fisheries (figure 7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1073	189	75	0	1031	143	47	0	955	135	36	0	1491	132	29
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	787	555	896	0	611	533	680	0	886	494	642	0	1029	771	626	0
PgtNth S	599	0	0	0	466	0	0	0	675	0	0	0	784	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	16992	5025	7739	6575	5685	5281	5873	4119	2865	3739	6334	3094	5076	3555	5686	2742
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	2606	1176	236	50	1650	924	146	26	2449	877	142	20	2778	1337	135	16
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	554	79	67	1	422	75	51	0	620	70	48	0	670	104	46	0
PgtNth S	907	5	1	2	732	5	0	1	1012	5	0	1	1083	6	0	1
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	1386	347	534	454	463	365	405	284	234	258	437	213	410	246	392	189
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
PgtSth N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Wash Cst N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal N	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Wash Ocn S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtNth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
PgtSth S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
terminal S	86094	25438	40496	34223	28804	26733	30731	21439	14514	18926	33145	16103	25718	17993	29752	14271
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.008	0.014	0.004	0.002	0.006	0.012	0.003	0.002	0.005	0.012	0.003	0.002	0.005	0.012	0.003	0.002
PgtNth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.004	0.004	0.009	0	0.004	0.004	0.009	0	0.003	0.004	0.009	0	0.003	0.004	0.009	0
PgtNth S	0.005	0	0	0	0.004	0	0	0	0.004	0	0	0	0.004	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205	0.213	0.211	0.204	0.205

**Table 3.8(c): Data and computation flow for Siuslaw 2003 preseason Canadian ISBM indices (figure7)**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	8	10	3	0.57	0.77	0.93	1	749.7	1104.53	832.68	224.02
Geo St T	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
North N	0	0	66	193	0.57	0.77	1	1	0	0	694.02	2020
Centr N	86	6	16	0	0.57	0.77	1	1	827.49	83.36	175.31	3.95
WCVI N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
J De F N	0	0	0	0	0.57	0.77	1	1	0	0	0	0
John St N	1	0	0	0	0.57	0.77	1	1	228.59	14.45	0	0
Fraser N	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0
Geo St S	0	0	0	0	0.57	0.77	0.93	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	14	7	1	0	223652	118649	133178	80668
Geo St T	0	0	0	0	223652	118649	133178	80668
North N	0	0	0	0	223652	118649	49845	66093
Centr N	42	4	0	0	223652	118649	49845	66093
WCVI N	0	0	0	0	223652	118649	49845	66093
J De F N	0	0	0	0	223652	118649	49845	66093
John St N	1	0	0	0	223652	118649	49845	66093
Fraser N	0	0	0	0	223652	118649	133178	80668
Geo St S	0	0	0	0	223652	118649	133178	80668

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1062	528	126	19	0.003	0.009	0.006	0.003
Geo St T	0	0	0	0	0	0	0	0
North N	0	0	566	1646	0	0	0.014	0.031
Centr N	1164	89	143	4	0.004	0.001	0.004	0
WCVI N	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0
John St N	273	12	0	0	0.001	0	0	0
Fraser N	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0

(8) sum of AEQ total mortality =	4795.4
(9) sum of cohort X AEQ BPER =	6958.09
(10) Canada ISBM =	0.69

**Table 3.8(d): Siuslaw base period exploitation rates in Canadian fisheries (figure7)**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	1147	660	150	0	1102	501	94	0	1021	473	71	0	1594	461	58
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	563	1046	0	0	427	655	0	0	461	492	0	0	414	436
Centr N	899	74	141	0	699	71	107	0	1012	66	115	0	1176	103	103	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	112	0	0	0	87	0	0	0	127	0	0	0	147	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1232	420	37	8	893	378	27	5	1455	392	27	4	1642	594	26	3
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Centr N	529	51	2	2	382	46	1	1	474	36	1	1	492	51	1	1
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	311	24	0	0	221	21	0	0	278	17	0	0	257	21	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St T	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
North N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Centr N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
WCVI N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
J De F N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
John St N	218301	132417	40496	34223	169636	127236	30731	21439	245770	117917	33145	16103	285566	184073	29752	14271
Fraser N	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913
Geo St S	218301	132417	105719	56748	169636	127236	80167	35535	245770	117917	75774	26967	285566	184073	73852	21913

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.004	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003	0.003	0.009	0.006	0.003
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031	0	0	0.014	0.031
Centr N	0.004	0.001	0.004	0	0.004	0.001	0.004	0	0.003	0.001	0.004	0	0.003	0.001	0.004	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



## APPENDIX 4: CALCULATION OF PRESEASON ISBM INDEX FOR CANADIAN STOCKS

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## METHODS FOR CALCULATING THE PRESEASON ISBM INDEX FOR CANADIAN STOCKS

The preseason ISBM indices for Canadian stocks (WCVI, Harrison, Cowichan, Nanaimo, GSQ, NTR, FRL) are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input	output
<i>termER.xls</i>	spreadsheet	various	
ISBM cei file	Text file	Projected catch	
ChinookModel	VB.net program	ISBM cei file	ISBM ccc file
CalcISBM	VB.net program	ISBM ccc file	Model ISBM.xls

### Part 1: Update terminal harvest rates

Update the terminal run and catch in *termER\_YYYY.xls* as follows:

- GST (Cowichan and Nanaimo): Manually copy the external harvest rate data from *Terminal Run & FP calculations for Lower Georgia St naturals\_04\_compl.xls* (Cowichan is in cells z9:z33, Nanaimo is all zeros) to *termER.xls*. Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER.xls* and write the ISBM indices to *model ISBM.xls*.
- Fraser Late (Harrison): Manually copy the external harvest rate data from *Terminal Run & FP calculations for Fraser sprint\_summer and lates 04.xls* (cells ac17:ac37) to *termER.xls*. Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER.xls* and write the ISBM indices to *model ISBM.xls*.
- WCVI (RBT): Manually copy the external harvest rate data from *FP calculations for Robertson Cr 04\_complete2.xls* (go to cell B46:B67) to *termER.xls*. Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER.xls* and write the ISBM indices to *model ISBM.xls*.

### Part 2: calculate the ISBM index using external harvest rates in spreadsheet.

Run the program *CalcISBM* to read the *ccc* file from the Chinook model projection run and *termER.xls* and write the ISBM indices to *model ISBM.xls* as follows:

- Make of a copy of the chinook model calibration folder that was used to calculate the SRFI index because the cei file in this folder has the fp controls for the current year replaces with expected catch . Name the new folder “preseason ISBM”. This folder should have 2 files named SRFI.cei and SRFI.ccc. Rename the both as ISBM.cei and ISBM.ccc. Rename the p.op7 file as ISBMp.op7. Send a copy of ISBM.cei to Canada and ask if there are any changes to Canadian catch expectations.
- If you can not find a copy of the SRFI.cei and SRFI.ccc files, then modify a calibration cei file by replacing the fp controls for the most recent year with the expected catch and rename it as ISBM.cei. Make a copy of the p.op7 file and rename it ISBMp.op7. Open ISBMp.op7 and update the following items (from top to bottom)
  - prefix (e.g. ISBM),
  - name of CEI file e.g. ISBM.CEI
- Go to the folder named Run calcISBM.vb using the IDE (for an unexplained reason, the exe file does not work).
- Enter the year for the ISBM index.
- Click on “use external rates”. Select “yes”. The program will prompt you for “termER\_YYYY.xls”.
- Click on “file”. Select ISBMp.op7 file.
- The program will ask you to “pick a stock”. Select one of the Canadian stocks. Click on “done picking stocks”.

- The program will write the ISBM indices to a spreadsheet named “*model ISBM.xls*”.

**TABLE 4.1(A): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 COWICHAN GST PRESEASON US ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0.6	0.84	0.99	1	0	0	0
PgtNth N	5	10	33	0	0	0.6	0.84	1	1	45.37	39.95	141.65
PgtSth N	0	0	0	0	0	0.6	0.84	1	1	0	0	0
Wash Cst N	2	14	0	0	0	0.6	0.84	0.99	1	21.46	14.5	0.34
Wash Ocn S	19	0	34	0	0	0.6	0.84	0.99	1	39.76	3.34	39.06
PgtNth S	0	6	22	0	0	0.6	0.84	0.99	1	68.24	27.75	103.47
PgtSth S	0	0	0	0	0	0.6	0.84	0.99	1	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	19573	13465	9438	379
PgtNth N	11	1	0	0	19573	13465	7430	300
PgtSth N	0	0	0	0	19573	13465	7430	300
Wash Cst N	29	3	0	0	19573	13465	9438	379
Wash Ocn S	31	3	3	0	19573	13465	9438	379
PgtNth S	20	2	3	0	19573	13465	9438	379
PgtSth S	0	0	0	0	19573	13465	9438	379

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	0.002	0.003	0.019	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.001	0.001	0	0
Wash Ocn S	0	0	0	0	0.002	0	0.004	0
PgtNth S	64	4	6	0	0.003	0.002	0.011	0
PgtSth S	0	0	0	0	0	0	0	0

(8) sum of AEQ total mortality =	246.23
(9) sum of cohort X AEQ BPER =	544.97
(10) US ISBM =	0.45

**TABLE 4.1(B): BASE PERIOD EXPLOITATION RATES FOR COWICHAN IN US FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	217	378	86	0	120	304	155	0	102	168	125	0	58	144	68	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	22	126	0	0	12	101	0	0	10	56	0	0	6	48	0	0
Wash Ocn S	217	0	35	0	120	0	63	0	102	0	51	0	58	0	28	0
PgtNth S	369	252	87	0	204	203	157	0	174	112	127	0	99	96	70	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	551	43	3	0	359	41	6	0	260	19	6	0	134	15	3	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	331	26	0	0	210	24	1	0	163	12	0	0	89	10	0	0
Wash Ocn S	479	36	3	0	259	29	5	0	225	16	4	0	119	13	2	0
PgtNth S	816	41	13	0	469	33	23	0	381	18	18	0	200	15	10	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtNth N	202946	119631	4698	154	112123	96034	8496	159	95583	53196	6834	286	54661	45369	3742	219
PgtSth N	202946	119631	4698	154	112123	96034	8496	159	95583	53196	6834	286	54661	45369	3742	219
Wash Cst N	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
Wash Ocn S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtNth S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtSth S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.002	0.003	0.019	0	0.003	0.003	0.019	0	0.002	0.003	0.019	0	0.002	0.003	0.019	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0
Wash Ocn S	0.002	0	0.004	0	0.002	0	0.004	0	0.002	0	0.004	0	0.002	0	0.004	0
PgtNth S	0.004	0.002	0.011	0	0.004	0.002	0.011	0	0.004	0.002	0.011	0	0.003	0.002	0.011	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.1(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 COWICHAN PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	8	7	0	0.6	0.84	0.99	1	69.22	948.15	633.07	17.88
Geo St T	16	31	21	1	0.6	0.84	0.99	1	733.55	2963.12	1090.23	41.67
North N	5	6	12	0	0.6	0.84	1	1	46.06	53.04	128.03	0
Centr N	104	20	22	5	0.6	0.84	1	1	701.31	180.72	232.02	49.48
WCVI N	7	8	0	0	0.6	0.84	1	1	15.15	10.34	0	0
J De F N	0	0	1	0	0.6	0.84	1	1	0	0	40	0
terminal N	0	0	0	0	1	1	1	1	113.63	338.5	909.02	36.67
John St N	5	3	6	0	0.6	0.84	1	1	574.62	494.81	1190.71	35.39
Fraser N	23	0	0	0	0.6	0.84	0.99	1	22.57	0.3	0.01	0
Geo St S	0	1412	1642	8	0.6	0.84	0.99	1	1951.49	4353.06	2665.28	12.48
terminal S	3934	3080	710	60	1	1	1	1	5206.25	10897.02	1152.15	105.25

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	1	0	0	19573	13465	9438	379
Geo St T	2	1	0	0	19573	13465	9438	379
North N	3	0	0	0	19573	13465	7430	300
Centr N	4	0	0	0	19573	13465	7430	300
WCVI N	9	0	0	0	19573	13465	7430	300
J De F N	0	0	0	0	19573	13465	7430	300
terminal N	0	0	0	0	929	2767	7430	300
John St N	0	0	0	0	19573	13465	7430	300
Fraser N	1	0	0	0	19573	13465	9438	379
Geo St S	145	148	117	1	19573	13465	9438	379
terminal S	283	213	49	4	929	2767	7430	300

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	93	86	32	1	0.004	0.07	0.067	0.047
Geo St T	135	155	79	3	0.037	0.22	0.116	0.11
North N	70	52	104	0	0.002	0.004	0.017	0
Centr N	953	176	190	41	0.036	0.013	0.031	0.165
WCVI N	0	0	0	0	0.001	0.001	0	0
J De F N	0	0	35	0	0	0	0.005	0
terminal N	0	0	0	0	0.122	0.122	0.122	0.122
John St N	847	527	1067	32	0.029	0.037	0.16	0.118
Fraser N	0	0	0	0	0.001	0	0	0
Geo St S	63	66	50	0	0.1	0.323	0.282	0.033
terminal S	0	0	0	0	5.606	3.939	0.155	0.351

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal N	0.27	0.27	0.27	0.27	929	2767	7430	300	248.9	741.46	1991.15	80.33

(8) sum of AEQ total mortality = 18625.24  
(9) sum of cohort X AEQ BPER = 38012.25  
(10) Canada ISBM = 0.49

**TABLE 4.1(D): BASE PERIOD EXPLOITATION RATES FOR COWICHAN IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)					1980 legal catch (ccc file)					1981 legal catch (ccc file)					1982 legal catch (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	43	9504	598	15		24	7629	1081	15		20	4226	871	27		12	3604	481	22	
Geo St T	11195	30783	1034	34		6185	24711	1868	35		5273	13688	1505	64		3015	11674	832	51	
North N	564	547	81	0		312	439	146	0		266	243	118	0		152	207	64	0	
Centr N	11629	1871	147	25		6425	1502	265	26		5477	832	213	47		3132	710	117	36	
WCVI N	108	105	0	0		60	84	0	0		51	47	0	0		29	40	0	0	
J De F N	0	0	25	0		0	0	46	0		0	0	37	0		0	0	20	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	9633	5215	753	18		5322	4186	1361	19		4537	2319	1095	34		2595	1978	600	26	
Fraser N	369	0	0	0		204	0	0	0		174	0	0	0		99	0	0	0	
Geo St S	38555	43168	2404	10		21301	34653	4346	10		18158	19195	3500	18		1976	16210	1935	15	
terminal S	40795	27362	680	50		22538	21965	1229	51		19214	12167	990	93		10988	10377	547	75	

Fishery	(12) 1979 shakers (ccc file)					1980 shakers (ccc file)					1981 shakers (ccc file)					1982 shakers (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	1146	523	12	0		591	401	22	0		566	241	18	1		315	201	10	0	
Geo St T	1562	558	18	1		783	445	32	1		649	246	26	1		346	209	14	1	
North N	240	15	0	0		115	10	0	0		111	7	0	0		61	5	0	0	
Centr N	492	46	0	0		253	35	0	0		184	16	0	0		94	13	0	0	
WCVI N	160	4	0	0		87	3	0	0		73	2	0	0		36	1	0	0	
J De F N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	289	22	0	0		146	16	0	0		108	8	0	0		49	5	0	0	
Fraser N	24	4	0	0		11	3	0	0		8	1	0	0		4	1	0	0	
Geo St S	2674	2979	166	1		1476	2391	300	1		1258	1324	242	1		842	1125	134	1	
terminal S	3160	1890	47	3		1723	1517	85	4		1446	840	68	6		807	716	38	5	

Fishery	(13) 1979 cohort (ccc file)					1980 cohort (ccc file)					1981 cohort (ccc file)					1982 cohort (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
Geo St T	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
North N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
Centr N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
WCVI N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
J De F N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
terminal N	7557	7408	4698	154		4186	5967	8496	159		3570	3298	6834	286		2347	2824	3742	219	
John St N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
Fraser N	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
Geo St S	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
terminal S	7557	7408	4698	154		4186	5967	8496	159		3570	3298	6834	286		2347	2824	3742	219	

Fishery	(14) 1979 exploitation rate					1980 exploitation rate					1981 exploitation rate					1982 exploitation rate				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	0.004	0.07	0.067	0.047		0.003	0.07	0.067	0.047		0.004	0.071	0.067	0.047		0.004	0.07	0.067	0.047	
Geo St T	0.038	0.22	0.116	0.11		0.037	0.22	0.116	0.11		0.037	0.22	0.116	0.11		0.037	0.22	0.116	0.11	
North N	0.002	0.004	0.017	0		0.002	0.004	0.017	0		0.002	0.004	0.017	0		0.002	0.004	0.017	0	
Centr N	0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165	
WCVI N	0.001	0.001	0	0		0.001	0.001	0	0		0.001	0.001	0	0		0.001	0.001	0	0	
J De F N	0	0	0.005	0		0	0	0.005	0		0	0	0.005	0		0	0	0.005	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	0.03	0.037	0.16	0.118		0.029	0.037	0.16	0.118		0.029	0.037	0.16	0.118		0.029	0.037	0.16	0.118	
Fraser N	0.001	0	0	0		0.001	0	0	0		0.001	0	0	0		0.001	0	0	0	
Geo St S	0.123	0.324	0.282	0.033		0.123	0.324	0.282	0.033		0.123	0.324	0.282	0.033		0.031	0.321	0.282	0.033	
terminal S	5.816	3.948	0.155	0.346		5.796	3.935	0.155	0.346		5.787	3.943	0.155	0.347		5.025	3.928	0.156	0.365	

**TABLE 4.2(A): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 NANAIMO PRESEASON US ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0.6	0.84	0.99	1	0	0	0
PgtNth N	5	10	33	0	0	0.6	0.84	1	1	45.37	39.95	141.65
PgtSth N	0	0	0	0	0	0.6	0.84	1	1	0	0	0
Wash Cst N	2	14	0	0	0	0.6	0.84	0.99	1	21.46	14.5	0.34
Wash Ocn S	19	0	34	0	0	0.6	0.84	0.99	1	39.76	3.34	39.06
PgtNth S	0	6	22	0	0	0.6	0.84	0.99	1	68.24	27.75	103.47
PgtSth S	0	0	0	0	0	0.6	0.84	0.99	1	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	19573	13465	9438	379
PgtNth N	11	1	0	0	19573	13465	7430	300
PgtSth N	0	0	0	0	19573	13465	7430	300
Wash Cst N	29	3	0	0	19573	13465	9438	379
Wash Ocn S	31	3	3	0	19573	13465	9438	379
PgtNth S	20	2	3	0	19573	13465	9438	379
PgtSth S	0	0	0	0	19573	13465	9438	379

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	0.002	0.003	0.019	0
PgtSth N	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0.001	0.001	0	0
Wash Ocn S	0	0	0	0	0.002	0	0.004	0
PgtNth S	64	4	6	0	0.003	0.002	0.011	0
PgtSth S	0	0	0	0	0	0	0	0

(8) sum of AEQ total mortality =	246.23
(9) sum of cohort X AEQ BPER =	544.97
(10) US ISBM =	0.45



**TABLE 4.2(B): BASE PERIOD EXPLOITATION RATES FOR NANAIMO IN US FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	217	378	86	0	120	304	155	0	102	168	125	0	58	144	68	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	22	126	0	0	12	101	0	0	10	56	0	0	6	48	0	0
Wash Ocn S	217	0	35	0	120	0	63	0	102	0	51	0	58	0	28	0
PgtNth S	369	252	87	0	204	203	157	0	174	112	127	0	99	96	70	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	551	43	3	0	359	41	6	0	260	19	6	0	134	15	3	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	331	26	0	0	210	24	1	0	163	12	0	0	89	10	0	0
Wash Ocn S	479	36	3	0	259	29	5	0	225	16	4	0	119	13	2	0
PgtNth S	816	41	13	0	469	33	23	0	381	18	18	0	200	15	10	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtNth N	202946	119631	4698	154	112123	96034	8496	159	95583	53196	6834	286	54661	45369	3742	219
PgtSth N	202946	119631	4698	154	112123	96034	8496	159	95583	53196	6834	286	54661	45369	3742	219
Wash Cst N	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
Wash Ocn S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtNth S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476
PgtSth S	202946	119631	9028	317	112123	96034	16320	328	95583	53196	13145	592	54661	45369	7266	476

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.002	0.003	0.019	0	0.003	0.003	0.019	0	0.002	0.003	0.019	0	0.002	0.003	0.019	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0
Wash Ocn S	0.002	0	0.004	0	0.002	0	0.004	0	0.002	0	0.004	0	0.002	0	0.004	0
PgtNth S	0.004	0.002	0.011	0	0.004	0.002	0.011	0	0.004	0.002	0.011	0	0.003	0.002	0.011	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.2(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 NANAIMO PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	8	7	0	0.6	0.84	0.99	1	69.22	948.15	633.07	17.88
Geo St T	16	31	21	1	0.6	0.84	0.99	1	733.55	2963.12	1090.23	41.67
North N	5	6	12	0	0.6	0.84	1	1	46.06	53.04	128.03	0
Centr N	104	20	22	5	0.6	0.84	1	1	701.31	180.72	232.02	49.48
WCVI N	7	8	0	0	0.6	0.84	1	1	15.15	10.34	0	0
J De F N	0	0	1	0	0.6	0.84	1	1	0	0	40	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	5	3	6	0	0.6	0.84	1	1	574.62	494.81	1190.71	35.39
Fraser N	23	0	0	0	0.6	0.84	0.99	1	22.57	0.3	0.01	0
Geo St S	0	1412	1642	8	0.6	0.84	0.99	1	1951.49	4353.06	2665.28	12.48
terminal S	3934	3080	710	60	1	1	1	1	113.63	338.5	909.02	36.67

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	1	0	0	19573	13465	9438	379
Geo St T	2	1	0	0	19573	13465	9438	379
North N	3	0	0	0	19573	13465	7430	300
Centr N	4	0	0	0	19573	13465	7430	300
WCVI N	9	0	0	0	19573	13465	7430	300
J De F N	0	0	0	0	19573	13465	7430	300
terminal N	0	0	0	0	929	2767	7430	300
John St N	0	0	0	0	19573	13465	7430	300
Fraser N	1	0	0	0	19573	13465	9438	379
Geo St S	145	148	117	1	19573	13465	9438	379
terminal S	283	213	49	4	929	2767	7430	300

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	93	86	32	1	0.004	0.07	0.067	0.047
Geo St T	135	155	79	3	0.037	0.22	0.116	0.11
North N	70	52	104	0	0.002	0.004	0.017	0
Centr N	953	176	190	41	0.036	0.013	0.031	0.165
WCVI N	0	0	0	0	0.001	0.001	0	0
J De F N	0	0	35	0	0	0	0.005	0
terminal N	0	0	0	0	0	0	0	0
John St N	847	527	1067	32	0.029	0.037	0.16	0.118
Fraser N	0	0	0	0	0.001	0	0	0
Geo St S	63	66	50	0	0.1	0.323	0.282	0.033
terminal S	0	0	0	0	0.122	0.122	0.122	0.122

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
terminal N	0	0	0	0	0	0	0	0	0	0	0	0
terminal S	0	0	0	0	929	2767	7430	300	0	0	0	0

(8) sum of AEQ total mortality =	10292.87
(9) sum of cohort X AEQ BPER =	20651.58
(10) Canada ISBM =	0.5

**TABLE 4.2(D): BASE PERIOD EXPLOITATION RATES FOR NANAIMO IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)					1980 legal catch (ccc file)					1981 legal catch (ccc file)					1982 legal catch (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	43	9504	598	15		24	7629	1081	15		20	4226	871	27		12	3604	481	22	
Geo St T	11195	30783	1034	34		6185	24711	1868	35		5273	13688	1505	64		3015	11674	832	51	
North N	564	547	81	0		312	439	146	0		266	243	118	0		152	207	64	0	
Centr N	11629	1871	147	25		6425	1502	265	26		5477	832	213	47		3132	710	117	36	
WCVI N	108	105	0	0		60	84	0	0		51	47	0	0		29	40	0	0	
J De F N	0	0	25	0		0	0	46	0		0	0	37	0		0	0	20	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	9633	5215	753	18		5322	4186	1361	19		4537	2319	1095	34		2595	1978	600	26	
Fraser N	369	0	0	0		204	0	0	0		174	0	0	0		99	0	0	0	
Geo St S	38555	43168	2404	10		21301	34653	4346	10		18158	19195	3500	18		1976	16210	1935	15	
terminal S	40795	27362	680	50		22538	21965	1229	51		19214	12167	990	93		10988	10377	547	75	

Fishery	(12) 1979 shakers (ccc file)					1980 shakers (ccc file)					1981 shakers (ccc file)					1982 shakers (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	1146	523	12	0		591	401	22	0		566	241	18	1		315	201	10	0	
Geo St T	1562	558	18	1		783	445	32	1		649	246	26	1		346	209	14	1	
North N	240	15	0	0		115	10	0	0		111	7	0	0		61	5	0	0	
Centr N	492	46	0	0		253	35	0	0		184	16	0	0		94	13	0	0	
WCVI N	160	4	0	0		87	3	0	0		73	2	0	0		36	1	0	0	
J De F N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	289	22	0	0		146	16	0	0		108	8	0	0		49	5	0	0	
Fraser N	24	4	0	0		11	3	0	0		8	1	0	0		4	1	0	0	
Geo St S	2674	2979	166	1		1476	2391	300	1		1258	1324	242	1		842	1125	134	1	
terminal S	3160	1890	47	3		1723	1517	85	4		1446	840	68	6		807	716	38	5	

Fishery	(13) 1979 cohort (ccc file)					1980 cohort (ccc file)					1981 cohort (ccc file)					1982 cohort (ccc file)				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
Geo St T	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
North N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
Centr N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
WCVI N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
J De F N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
terminal N	7557	7408	4698	154		4186	5967	8496	159		3570	3298	6834	286		2347	2824	3742	219	
John St N	202946	119631	4698	154		112123	96034	8496	159		95583	53196	6834	286		54661	45369	3742	219	
Fraser N	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
Geo St S	202946	119631	9028	317		112123	96034	16320	328		95583	53196	13145	592		54661	45369	7266	476	
terminal S	7557	7408	4698	154		4186	5967	8496	159		3570	3298	6834	286		2347	2824	3742	219	

Fishery	(14) 1979 exploitation rate					1980 exploitation rate					1981 exploitation rate					1982 exploitation rate				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	0.004	0.07	0.067	0.047		0.003	0.07	0.067	0.047		0.004	0.071	0.067	0.047		0.004	0.07	0.067	0.047	
Geo St T	0.038	0.22	0.116	0.11		0.037	0.22	0.116	0.11		0.037	0.22	0.116	0.11		0.037	0.22	0.116	0.11	
North N	0.002	0.004	0.017	0		0.002	0.004	0.017	0		0.002	0.004	0.017	0		0.002	0.004	0.017	0	
Centr N	0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165		0.036	0.013	0.031	0.165	
WCVI N	0.001	0.001	0	0		0.001	0.001	0	0		0.001	0.001	0	0		0.001	0.001	0	0	
J De F N	0	0	0.005	0		0	0	0.005	0		0	0	0.005	0		0	0	0.005	0	
terminal N	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
John St N	0.03	0.037	0.16	0.118		0.029	0.037	0.16	0.118		0.029	0.037	0.16	0.118		0.029	0.037	0.16	0.118	
Fraser N	0.001	0	0	0		0.001	0	0	0		0.001	0	0	0		0.001	0	0	0	
Geo St S	0.123	0.324	0.282	0.033		0.123	0.324	0.282	0.033		0.123	0.324	0.282	0.033		0.031	0.321	0.282	0.033	
terminal S	5.816	3.948	0.155	0.346		5.796	3.935	0.155	0.346		5.787	3.943	0.155	0.347		5.025	3.928	0.156	0.365	

**TABLE 4.3(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 UPPER GEORGIA STRAIT PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	11	109	39	0.52	0.74	0.92	1	320.89	1259.07	8683.12	3127.56
Geo St T	5	8	5	0	0.52	0.74	0.92	1	462.32	648.42	230.73	2.94
North N	83	364	147	149	0.52	0.74	1	1	505.12	2824.17	1535.73	1555.33
Centr N	627	403	279	197	0.52	0.74	1	1	3606.37	3235.07	2998.19	2122.19
WCVI N	0	0	0	150	0.52	0.74	1	1	0	0	1.03	239.12
J De F N	0	2	0	0	0.52	0.74	1	1	30.16	51.41	0	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	6	5	23	19	0.52	0.74	1	1	732.86	731.68	4752.25	3868.93
Fraser N	0	0	0	0	0.52	0.74	0.92	1	0	0	0	0
Geo St S	0	303	2670	1543	0.52	0.74	0.92	1	592.15	826.13	4042.01	2406.16
terminal S	0	0	0	0	1	1	1	1	0	0	0	0

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	6	4	3	1	97436	75137	97294	31692
Geo St T	8	5	1	0	97436	75137	97294	31692
North N	14	1	0	0	97436	75137	23977	21633
Centr N	18	2	0	0	97436	75137	23977	21633
WCVI N	0	0	1	2	97436	75137	23977	21633
J De F N	1	0	0	0	97436	75137	23977	21633
terminal N	0	0	0	0	65	859	23977	21633
John St N	0	0	0	0	97436	75137	23977	21633
Fraser N	0	0	0	0	97436	75137	97294	31692
Geo St S	720	301	225	111	97436	75137	97294	31692
terminal S	0	0	0	0	65	859	23977	21633

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	466	356	447	141	0.003	0.017	0.089	0.099
Geo St T	395	273	53	4	0.005	0.009	0.002	0
North N	833	3106	1254	1270	0.005	0.038	0.064	0.072
Centr N	5692	3567	2462	1741	0.037	0.043	0.125	0.098
WCVI N	0	0	0	0	0	0	0	0.011
J De F N	52	61	0	0	0	0.001	0	0
terminal N	0	0	0	0	0	0	0	0
John St N	1233	880	4258	3468	0.008	0.01	0.198	0.179
Fraser N	0	0	0	0	0	0	0	0
Geo St S	301	125	91	45	0.006	0.011	0.042	0.076
terminal S	0	0	0	0	0	0	0	0

(8) sum of AEQ total mortality =	33328.55
(9) sum of cohort X AEQ BPER =	51391.1
(10) Canada ISBM =	0.65

**TABLE 4.3(D): BASE PERIOD EXPLOITATION RATES FOR UPPER GEORGIA STRAIT N IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	42	1334	2678	2312	60	870	4557	1394	28	1248	2975	2373	30	570	4267	1544
Geo St T	189	776	71	0	271	506	121	0	124	726	79	0	136	331	113	0
North N	547	3505	371	961	783	2287	631	580	358	3281	410	980	392	1497	575	620
Centr N	4271	4002	723	1311	6115	2610	1231	791	2792	3745	801	1337	3059	1709	1124	846
WCVI N	0	0	0	146	0	0	0	88	0	0	0	149	0	0	0	94
J De F N	0	62	0	0	0	40	0	0	0	58	0	0	0	27	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	821	900	1147	2389	1175	587	1952	1441	536	842	1270	2436	588	384	1781	1541
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	610	962	1188	1698	874	627	2022	1023	399	900	1320	1742	83	407	1893	1122
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	349	232	52	41	467	142	88	25	240	227	59	43	255	101	84	28
Geo St T	421	33	2	2	540	20	3	1	238	29	2	2	241	13	3	1
North N	73	9	0	0	90	5	0	0	47	8	0	0	49	3	0	0
Centr N	150	27	0	1	199	16	0	0	78	20	0	1	76	8	0	1
WCVI N	0	0	0	2	0	0	0	1	0	0	0	2	0	0	1	2
J De F N	38	2	0	0	51	1	0	0	24	2	0	0	26	1	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	88	13	0	3	115	8	0	1	46	10	0	3	40	3	0	2
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	46	66	83	117	66	43	141	71	30	62	92	120	577	32	131	79
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	61783	69376	28287	23849	88456	45254	48138	14378	40388	64933	31428	24474	44242	29635	45066	15921
Geo St T	61783	69376	28287	23849	88456	45254	48138	14378	40388	64933	31428	24474	44242	29635	45066	15921
North N	61783	69376	5788	13373	88456	45254	9851	8064	40388	64933	6409	13635	44242	29635	8988	8629
Centr N	61783	69376	5788	13373	88456	45254	9851	8064	40388	64933	6409	13635	44242	29635	8988	8629
WCVI N	61783	69376	5788	13373	88456	45254	9851	8064	40388	64933	6409	13635	44242	29635	8988	8629
J De F N	61783	69376	5788	13373	88456	45254	9851	8064	40388	64933	6409	13635	44242	29635	8988	8629
terminal N	40	724	5788	13373	58	473	9851	8064	27	678	6409	13635	29	309	8988	8629
John St N	61783	69376	5788	13373	88456	45254	9851	8064	40388	64933	6409	13635	44242	29635	8988	8629
Fraser N	61783	69376	28287	23849	88456	45254	48138	14378	40388	64933	31428	24474	44242	29635	45066	15921
Geo St S	61783	69376	28287	23849	88456	45254	48138	14378	40388	64933	31428	24474	44242	29635	45066	15921
terminal S	40	724	5788	13373	58	473	9851	8064	27	678	6409	13635	29	309	8988	8629

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.017	0.089	0.099	0.003	0.017	0.089	0.099	0.003	0.017	0.089	0.099	0.003	0.017	0.089	0.099
Geo St T	0.005	0.009	0.002	0	0.005	0.009	0.002	0	0.005	0.009	0.002	0	0.004	0.009	0.002	0
North N	0.005	0.038	0.064	0.072	0.005	0.038	0.064	0.072	0.005	0.038	0.064	0.072	0.005	0.038	0.064	0.072
Centr N	0.037	0.043	0.125	0.098	0.037	0.043	0.125	0.098	0.037	0.043	0.125	0.098	0.037	0.043	0.125	0.098
WCVI N	0	0	0	0.011	0	0	0	0.011	0	0	0	0.011	0	0	0	0.011
J De F N	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.008	0.01	0.198	0.179	0.008	0.01	0.198	0.179	0.007	0.01	0.198	0.179	0.007	0.01	0.198	0.179
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.006	0.011	0.042	0.076	0.006	0.011	0.042	0.076	0.006	0.011	0.042	0.076	0.008	0.011	0.042	0.075
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.4(A): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 FRASER LATE'S PRESEASON US ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	759	27011	4205	0	0.62	0.84	0.99	1	2594.97	17658.83	3114.74	6.4
PgtNth N	916	334	145	0	0.62	0.84	1	1	2846.04	1200.11	650.34	2.42
PgtSth N	2098	486	0	0	0.62	0.84	1	1	1650.44	455.4	0	0
Wash Cst N	1199	1296	0	0	0.62	0.84	0.99	1	1085.69	1096.88	2.83	0.09
Wash Ocn S	1392	7150	511	79	0.62	0.84	0.99	1	1437.39	6649.06	576.47	90.78
PgtNth S	0	459	0	0	0.62	0.84	0.99	1	1685.92	1861.89	0.38	0.27
PgtSth S	0	1375	47	0	0.62	0.84	0.99	1	4139.65	3095.81	123.51	0.57

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	3104	2763	229	5	370614	342404	80739	8598
PgtNth N	203	25	3	0	370614	342404	66259	9389
PgtSth N	709	87	0	0	370614	342404	66259	9389
Wash Cst N	541	66	2	0	370614	342404	80739	8598
Wash Ocn S	661	563	38	6	370614	342404	80739	8598
PgtNth S	380	84	0	0	370614	342404	80739	8598
PgtSth S	1332	259	7	0	370614	342404	80739	8598

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0.007	0.052	0.039	0.001
PgtNth N	0	0	0	0	0.008	0.004	0.01	0
PgtSth N	0	0	0	0	0.004	0.001	0	0
Wash Cst N	0	0	0	0	0.003	0.003	0	0
Wash Ocn S	0	0	0	0	0.004	0.019	0.007	0.011
PgtNth S	1218	189	1	0	0.005	0.005	0	0
PgtSth S	1783	247	6	0	0.011	0.009	0.002	0

(8) sum of AEQ total mortality =	51060.26
(9) sum of cohort X AEQ BPER =	52026.86
(10) US ISBM =	0.98

**TABLE 4.4(B): BASE PERIOD EXPLOITATION RATES FOR FRASER LATES IN US FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	891	28379	9552	0	1381	21990	7455	0	1009	34177	5797	0	821	24991	9002	0
PgtNth N	6234	2036	807	0	9668	1577	631	0	7064	2452	490	0	5750	1793	762	0
PgtSth N	3463	718	0	0	5371	557	0	0	3924	865	0	0	3194	633	0	0
Wash Cst N	1979	1916	0	0	3069	1485	0	0	2242	2307	0	0	1825	1687	0	0
Wash Ocn S	2474	11375	1756	280	3837	8815	1370	238	2803	13700	1066	186	2282	10017	1655	145
PgtNth S	2127	2994	0	0	3300	2320	0	0	2411	3605	0	0	1962	2636	0	0
PgtSth S	5838	4969	351	0	9055	3851	274	0	6615	5985	213	0	5385	4376	331	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	7317	4906	731	24	9252	3167	488	17	6924	5028	387	14	5503	3600	590	10
PgtNth N	1661	182	66	7	3042	167	51	6	1889	220	48	6	1379	144	65	4
PgtSth N	1085	119	0	0	2254	124	0	0	1151	134	0	0	911	95	0	0
Wash Cst N	997	110	9	0	1776	97	8	0	1180	138	6	0	923	97	8	0
Wash Ocn S	1571	939	134	20	2387	725	104	17	1771	1129	81	13	1340	815	125	10
PgtNth S	2606	454	1	1	4196	352	1	1	2929	546	1	1	2199	398	1	0
PgtSth S	5388	759	53	2	9172	592	42	2	6491	918	33	1	5308	672	51	1

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
PgtNth N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
PgtSth N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
Wash Cst N	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
Wash Ocn S	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
PgtNth S	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
PgtSth S	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0.008	0.053	0.039	0.001	0.007	0.051	0.038	0.001	0.007	0.051	0.039	0.001	0.007	0.051	0.038	0.001
PgtNth N	0.008	0.003	0.01	0	0.008	0.004	0.01	0	0.008	0.003	0.01	0	0.007	0.003	0.01	0
PgtSth N	0.004	0.001	0	0	0.005	0.001	0	0	0.004	0.001	0	0	0.004	0.001	0	0
Wash Cst N	0.003	0.003	0	0	0.003	0.003	0	0	0.003	0.003	0	0	0.003	0.003	0	0
Wash Ocn S	0.004	0.019	0.007	0.011	0.004	0.019	0.007	0.011	0.004	0.019	0.007	0.011	0.004	0.019	0.007	0.011
PgtNth S	0.005	0.005	0	0	0.005	0.005	0	0	0.005	0.005	0	0	0.004	0.005	0	0
PgtSth S	0.011	0.009	0.002	0	0.011	0.009	0.002	0	0.011	0.009	0.002	0	0.011	0.009	0.002	0

**TABLE 4.4(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 FRASER LATES PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	2	207	57	1	0.62	0.84	0.99	1	1347.5	22171.68	4792.77	108.57
Geo St T	50	386	349	0	0.62	0.84	0.99	1	3288.41	35097.52	17591.51	22.36
North N	0	0	16	0	0.62	0.84	1	1	0	0	164.84	0
Centr N	418	57	0	0	0.62	0.84	1	1	3120.73	576.16	0	0
WCVI N	286	437	0	0	0.62	0.84	1	1	430.66	559.28	0	0
J De F N	11	37	3	0	0.62	0.84	1	1	361.59	1074.76	109.26	0.24
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	20	24	2	0	0.62	0.84	1	1	2676.21	3890.49	491.35	23.4
Fraser N	11150	19040	829	27	1	1	1	1	1978.21	4130.68	2981.65	422.49
Geo St S	0	19253	10987	29	0.62	0.84	0.99	1	15585.2	56393.29	17529.63	45.45
terminal S	0	0	0	0	1	1	1	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	23	22	2	0	370614	342404	80739	8598				
Geo St T	32	31	7	0	370614	342404	80739	8598				
North N	0	0	0	0	370614	342404	66259	9389				
Centr N	70	10	0	0	370614	342404	66259	9389				
WCVI N	164	7	0	0	370614	342404	66259	9389				
J De F N	6	0	0	0	370614	342404	66259	9389				
terminal N	0	0	0	0	43960	91793	66259	9389				
John St N	1	0	0	0	370614	342404	66259	9389				
Fraser N	1450	1004	35	18	43960	91793	66259	9389				
Geo St S	2737	2603	792	3	370614	342404	80739	8598				
terminal S	0	0	0	0	43960	91793	66259	9389				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1768	2162	254	6	0.004	0.065	0.059	0.013				
Geo St T	1619	2503	1278	3	0.009	0.103	0.218	0.003				
North N	0	0	135	0	0	0	0.002	0				
Centr N	4354	597	0	0	0.008	0.002	0	0				
WCVI N	0	0	0	0	0.001	0.002	0	0				
J De F N	539	1179	96	0	0.001	0.003	0.002	0				
terminal N	0	0	0	0	0	0	0	0				
John St N	3933	4351	440	21	0.007	0.011	0.007	0.002				
Fraser N	0	0	0	0	0.045	0.045	0.045	0.045				
Geo St S	1161	1110	334	1	0.042	0.165	0.217	0.005				
terminal S	0	0	0	0	0	0	0	0				
For the fisheries (below) with external AEQ harvest rates, the base period exploitation rates shown above are from external AEQ harvest rates and a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs												
fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Fraser N	0.01	0.01	0.01	0.01	43960	91793	66259	9389	484.21	1011.06	729.82	103.41
(8) sum of AEQ total mortality =				57134.49								
(9) sum of cohort X AEQ BPER =				196965.9								
(10) Canada ISBM =				0.29								



**TABLE 4.4(D): BASE PERIOD EXPLOITATION RATES FOR FRASER LATES IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	297	38856	15382	350	460	30109	12004	298	336	46795	9335	233	274	34217	14496	181
Geo St T	5393	63762	56682	70	8364	49408	44234	60	6111	76790	34397	47	4974	56150	53417	36
North N	0	0	220	0	0	0	172	0	0	0	134	0	0	0	208	0
Centr N	7421	898	0	0	11510	696	0	0	8409	1082	0	0	6845	791	0	0
WCVI N	742	1018	0	0	1151	789	0	0	841	1226	0	0	685	896	0	0
J De F N	643	1976	147	0	998	1531	115	0	729	2379	89	0	593	1740	139	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	6728	7125	660	70	10436	5521	516	59	7624	8580	401	46	6206	6274	623	36
Fraser N	26328	9313	1761	140	40919	7242	1376	119	29920	11246	1070	93	25294	8215	1662	72
Geo St S	48583	97888	53732	140	75353	75851	41932	119	55051	117888	32607	93	8528	85357	50637	72
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	3456	2191	324	8	5002	1618	250	7	4110	2729	199	6	3249	1955	307	4
Geo St T	4227	1232	968	4	5881	942	755	3	4157	1459	587	2	3129	1058	911	2
North N	0	0	2	0	0	0	2	0	0	0	1	0	0	0	2	0
Centr N	1484	196	0	0	2137	141	0	0	1337	188	0	0	973	123	0	0
WCVI N	483	19	0	0	735	14	0	0	529	22	0	0	376	14	0	0
J De F N	379	15	1	1	545	10	0	1	416	17	0	1	332	12	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	873	94	2	6	1237	66	2	5	785	89	2	4	507	52	2	3
Fraser N	2681	384	57	74	4587	329	49	69	3341	509	38	54	2520	332	53	37
Geo St S	3393	6754	3716	10	5256	5234	2899	8	3838	8134	2254	6	7871	5949	3498	7
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
Geo St T	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
North N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
Centr N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
WCVI N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
J De F N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
terminal N	65915	28509	89382	30366	102446	22169	69844	25836	74910	34428	54292	20188	63327	25148	84367	15692
John St N	611725	506045	89382	30366	948793	392123	69844	25836	693168	609439	54292	20188	564245	445630	84367	15692
Fraser N	65915	28509	89382	30366	102446	22169	69844	25836	74910	34428	54292	20188	63327	25148	84367	15692
Geo St S	611725	506045	257978	28372	948793	392123	201321	24134	693168	609439	156551	18858	564245	445630	243118	14659
terminal S	65915	28509	89382	30366	102446	22169	69844	25836	74910	34428	54292	20188	63327	25148	84367	15692
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.004	0.065	0.059	0.013	0.003	0.065	0.059	0.013	0.004	0.065	0.059	0.013	0.004	0.065	0.059	0.013
Geo St T	0.009	0.103	0.218	0.003	0.009	0.103	0.218	0.003	0.009	0.102	0.218	0.003	0.009	0.102	0.218	0.003
North N	0	0	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0	0.002	0
Centr N	0.009	0.002	0	0	0.009	0.002	0	0	0.008	0.002	0	0	0.008	0.002	0	0
WCVI N	0.001	0.002	0	0	0.001	0.002	0	0	0.001	0.002	0	0	0.001	0.002	0	0
J De F N	0.001	0.003	0.002	0	0.001	0.003	0.002	0	0.001	0.003	0.002	0	0.001	0.003	0.002	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.007	0.011	0.007	0.002	0.007	0.011	0.007	0.002	0.007	0.011	0.007	0.003	0.007	0.011	0.007	0.002
Fraser N	0.44	0.34	0.02	0.007	0.444	0.341	0.02	0.007	0.444	0.341	0.02	0.007	0.439	0.34	0.02	0.007
Geo St S	0.05	0.165	0.217	0.005	0.05	0.165	0.217	0.005	0.05	0.165	0.217	0.005	0.017	0.164	0.217	0.005
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.5(A): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 FRASER EARLY'S PRESEASON US ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate				
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	
WA/OR T	0	0	0	0	0	0.58	0.81	0.97	1	0	0	0	0
PgtNth N	0	208	1996	0	0	0.58	0.81	1	1	379.14	744.39	8339.86	11.22
PgtSth N	0	0	0	0	0	0.58	0.81	1	1	0	0	0	0
Wash Cst N	0	0	0	0	0	0.58	0.81	0.97	1	0	0	0	0
Wash Ocn S	0	0	832	0	0	0.58	0.81	0.97	1	304.13	42.26	935.69	0.65
PgtNth S	0	0	0	0	0	0.58	0.81	0.97	1	0	0	0	0
PgtSth S	0	0	0	0	0	0.58	0.81	0.97	1	1379.34	11.77	1.86	3.17
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	0	0	0	0	237098	177349	186410	47496					
PgtNth N	130	13	7	1	237098	177349	140238	43494					
PgtSth N	0	0	0	0	237098	177349	140238	43494					
Wash Cst N	0	0	0	0	237098	177349	186410	47496					
Wash Ocn S	362	36	63	0	237098	177349	186410	47496					
PgtNth S	0	0	0	0	237098	177349	186410	47496					
PgtSth S	0	0	0	0	237098	177349	186410	47496					
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates								
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5					
WA/OR T	0	0	0	0	0	0	0	0					
PgtNth N	0	0	0	0	0.002	0.004	0.059	0					
PgtSth N	0	0	0	0	0	0	0	0					
Wash Cst N	0	0	0	0	0	0	0	0					
Wash Ocn S	0	0	0	0	0.001	0	0.005	0					
PgtNth S	0	0	0	0	0	0	0	0					
PgtSth S	0	0	0	0	0.006	0	0	0					
(8) sum of AEQ total mortality =				3361.4									
(9) sum of cohort X AEQ BPER =				12153.49									
(10) US ISBM =				0.28									

**TABLE 4.5(B): BASE PERIOD EXPLOITATION RATES FOR FRASER EARLY'S IN US FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0	489	3905	0	0	436	2977	0	0	477	2649	0	0	499	2974	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	470	0	0	0	358	0	0	0	320	0	0	0	350	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	228	0	0	0	249	0	0	0	260	0	0	0	299	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	328	36	49	5	423	38	37	5	376	36	40	4	388	33	39	3
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	276	31	37	0	295	27	28	0	314	30	25	0	333	29	27	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	929	8	1	2	1129	8	1	2	1139	8	1	1	1316	9	1	1

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
PgtNth N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
PgtSth N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
Wash Cst N	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
Wash Ocn S	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
PgtNth S	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
PgtSth S	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth N	0.002	0.004	0.059	0	0.002	0.004	0.059	0	0.002	0.004	0.06	0	0.001	0.004	0.059	0
PgtSth N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn S	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0	0.001	0	0.005	0
PgtNth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtSth S	0.006	0	0	0	0.006	0	0	0	0.006	0	0	0	0.006	0	0	0

**TABLE 4.5(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR FRASER EARLYS NATURALS PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	2	51	12	0.58	0.81	0.97	1	771.77	609.04	4307.72	921.48
Geo St T	0	3	9	0	0.58	0.81	0.97	1	822.17	300.98	443.65	4.4
North N	54	31	378	84	0.58	0.81	1	1	475.53	276.4	3953.85	876.9
Centr N	114	80	0	0	0.58	0.81	1	1	993.95	739.42	0	0
WCVI N	0	0	0	0	0.58	0.81	1	1	0	0	0	0
J De F N	0	0	0	62	0.58	0.81	1	1	0	0	0.97	2281.04
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	3	8	31	3	0.58	0.81	1	1	549.58	1405.49	6423.06	709.92
Fraser N	0	0	49333	10246	1	1	1	1	427.57	494.59	77784.43	16245.01
Geo St S	0	1058	1658	1234	0.58	0.81	0.97	1	1546.83	3139.67	2632.15	1924.82
terminal S	0	0	0	0	1	1	1	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	15	10	3	0	237098	177349	186410	47496				
Geo St T	20	13	2	0	237098	177349	186410	47496				
North N	34	3	0	0	237098	177349	140238	43494				
Centr N	45	5	0	0	237098	177349	140238	43494				
WCVI N	0	0	0	0	237098	177349	140238	43494				
J De F N	0	0	0	0	237098	177349	140238	43494				
terminal N	0	0	0	0	10070	35131	140238	43494				
John St N	1	0	0	0	237098	177349	140238	43494				
Fraser N	332	384	73	86	10070	35131	140238	43494				
Geo St S	1751	733	192	92	237098	177349	186410	47496				
terminal S	0	0	0	0	10070	35131	140238	43494				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Centr T	1126	753	307	46	0.003	0.003	0.023	0.019				
Geo St T	921	591	100	6	0.003	0.002	0.002	0				
North N	772	287	3223	714	0.002	0.002	0.028	0.02				
Centr N	1440	752	0	0	0.004	0.004	0	0				
WCVI N	0	0	0	0	0	0	0	0				
J De F N	0	0	1	1999	0	0	0	0.052				
terminal N	0	0	0	0	0	0	0	0				
John St N	781	1552	5754	638	0.002	0.008	0.046	0.016				
Fraser N	0	0	0	0	0.042	0.014	0.555	0.374				
Geo St S	732	306	78	37	0.007	0.018	0.014	0.041				
terminal S	0	0	0	0	0	0	0	0				
(8) sum of AEQ total mortality =				86592.21								
(9) sum of cohort X AEQ BPER =				131062.4								
(10) Canada ISBM =				0.66								

**TABLE 4.5(D): BASE PERIOD EXPLOITATION RATES FOR FRASER EARLY'S IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	122	2273	486	0	109	1733	469	0	119	1545	357	0	125	1692	318
Geo St T	0	183	235	0	0	163	179	0	0	179	160	0	0	187	175	0
North N	284	183	1874	404	311	163	1429	390	325	179	1271	296	374	187	1428	272
Centr N	626	489	0	0	685	436	0	0	715	477	0	0	823	499	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	1051	0	0	0	1013	0	0	0	770	0	0	0	707
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	341	978	3046	324	373	872	2322	312	390	955	2066	237	449	998	2320	217
Fraser N	0	0	36859	7441	0	0	28100	7169	0	0	25004	5452	0	0	28077	5002
Geo St S	1138	2078	1332	973	1245	1852	1016	937	1301	2028	906	714	285	2100	992	629
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	681	308	62	11	695	256	46	10	817	316	43	8	912	320	47	7
Geo St T	816	33	6	3	798	26	4	2	807	28	4	2	856	27	4	1
North N	143	13	2	0	135	10	1	0	161	12	1	0	176	12	1	0
Centr N	293	39	0	0	297	33	0	0	266	31	0	0	273	28	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	172	19	2	4	172	15	1	3	156	15	1	3	143	12	1	3
Fraser N	204	266	43	49	246	261	36	52	256	285	32	39	261	265	32	32
Geo St S	87	143	95	67	94	128	72	65	98	140	64	49	2067	159	70	45
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
Geo St T	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
North N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
Centr N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
WCVI N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
J De F N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
terminal N	5012	19715	66533	20057	5489	17585	50723	19326	5737	19249	45135	14695	6569	20107	50681	13484
John St N	120682	101219	66533	20057	131998	90226	50723	19326	137963	98806	45135	14695	158630	103283	50681	13484
Fraser N	5012	19715	66533	20057	5489	17585	50723	19326	5737	19249	45135	14695	6569	20107	50681	13484
Geo St S	120682	101219	97890	25609	131998	90226	74614	24672	137963	98806	66555	18809	158630	103283	72852	16737
terminal S	5012	19715	66533	20057	5489	17585	50723	19326	5737	19249	45135	14695	6569	20107	50681	13484
Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.003	0.003	0.023	0.019	0.003	0.003	0.023	0.019	0.003	0.004	0.023	0.019	0.003	0.003	0.023	0.019
Geo St T	0.004	0.002	0.002	0	0.003	0.002	0.002	0	0.003	0.002	0.002	0	0.003	0.002	0.002	0
North N	0.002	0.002	0.028	0.02	0.002	0.002	0.028	0.02	0.002	0.002	0.028	0.02	0.002	0.002	0.028	0.02
Centr N	0.004	0.004	0	0	0.004	0.004	0	0	0.004	0.004	0	0	0.004	0.004	0	0
WCVI N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J De F N	0	0	0	0.052	0	0	0	0.052	0	0	0	0.052	0	0	0	0.052
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.002	0.008	0.046	0.016	0.002	0.008	0.046	0.016	0.002	0.008	0.046	0.016	0.002	0.008	0.046	0.016
Fraser N	0.041	0.013	0.555	0.373	0.045	0.015	0.555	0.374	0.045	0.015	0.555	0.374	0.04	0.013	0.555	0.373
Geo St S	0.006	0.018	0.014	0.041	0.006	0.018	0.014	0.041	0.006	0.018	0.014	0.041	0.009	0.018	0.014	0.04
terminal S	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.6(A): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 WCVI NATURAL PRESEASON US ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	1	0	0	0.58	0.81	0.96	1	60.17	26.06	17.89	4.83
PgtNth N	0	1	7	0	0.58	0.81	1	1	16.68	3.15	34.62	1.39
PgtSth N	2	0	9	0	0.58	0.81	1	1	12.15	0.83	33.73	7.08
Wash Cst I	0	0	0	0	0.58	0.81	0.96	1	0	0	0	0
Wash Ocn	0	0	0	0	0.58	0.81	0.96	1	0	0	0	0
PgtNth S	0	0	1	0	0.58	0.81	0.96	1	21.47	0.13	6.91	0.2
PgtSth S	0	0	0	0	0.58	0.81	0.96	1	0	0	0	0
Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	83	26	15	4	9988	4209	9774	6495				
PgtNth N	5	0	0	0	9988	4209	6113	5382				
PgtSth N	19	1	10	3	9988	4209	6113	5382				
Wash Cst I	0	0	0	0	9988	4209	9774	6495				
Wash Ocn	0	0	0	0	9988	4209	9774	6495				
PgtNth S	10	0	0	0	9988	4209	9774	6495				
PgtSth S	0	0	0	0	9988	4209	9774	6495				
Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
WA/OR T	0	0	0	0	0.006	0.006	0.002	0.001				
PgtNth N	0	0	0	0	0.002	0.001	0.006	0				
PgtSth N	0	0	0	0	0.001	0	0.006	0.001				
Wash Cst I	0	0	0	0	0	0	0	0				
Wash Ocn	0	0	0	0	0	0	0	0				
PgtNth S	33	1	0	0	0.002	0	0.001	0				
PgtSth S	0	0	0	0	0	0	0	0				
(8) sum of AEQ total mortality =				162.61								
(9) sum of cohort X AEQ BPER =				247.3								
(10) US ISBM =				0.66								

**TABLE 4.6(B): BASE PERIOD EXPLOITATION RATES FOR WCVI NATURALS IN US FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc f	
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3
WA/OR T	0	24	0	0	0	10	0	0	0	30	0	0	0	12
PgtNth N	10	95	48	0	29	39	270	0	11	120	62	0	10	48
PgtSth N	24	0	15	0	68	0	84	0	27	0	19	0	24	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0	0	13	0	0	0	65	0	0	0	25	0	0	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)	
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3
WA/OR T	1194	1467	45	6	2800	491	183	3	1116	1550	73	12	980	601
PgtNth N	272	60	7	1	923	29	41	1	305	77	11	3	246	27
PgtSth N	177	40	40	6	684	22	202	3	186	47	55	14	163	18
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	376	7	2	0	1128	3	10	0	417	8	4	1	342	3
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)	
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3
WA/OR T	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391
PgtNth N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391
PgtSth N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391
Wash Cst I	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391
Wash Ocn	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391
PgtNth S	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391
PgtSth S	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate	
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3
WA/OR T	0.007	0.007	0.002	0.001	0.006	0.006	0.002	0.001	0.006	0.006	0.002	0.001	0.006	0.006
PgtNth N	0.002	0.001	0.006	0	0.002	0.001	0.006	0	0.002	0.001	0.006	0	0.001	0.001
PgtSth N	0.001	0	0.006	0.001	0.001	0	0.005	0.001	0.001	0	0.006	0.001	0.001	0
Wash Cst I	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wash Ocn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PgtNth S	0.002	0	0.001	0	0.002	0	0.001	0	0.002	0	0.001	0	0.002	0
PgtSth S	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**TABLE 4.6(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 WCVI NATURALS PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	2	8	3	0.58	0.81	0.96	1	44.55	206.88	622.06	233.1
Geo St T	0	0	0	0	0.58	0.81	0.96	1	34.98	2.65	0.13	0.6
North N	0	5	18	23	0.58	0.81	1	1	7.49	43.23	192.5	245.28
Centr N	3	2	9	4	0.58	0.81	1	1	31.79	16.67	92.83	40.37
WCVI N	4	26	357	540	1	1	1	1	258.49	401.2	2864.92	2522.3
J De F N	0	0	0	0	0.58	0.81	1	1	7	8.34	6.22	0.14
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	0	0	0	1	0.58	0.81	1	1	15.39	7.82	51.59	236.31
Fraser N	0	0	4	0	0.58	0.81	0.96	1	0.55	0.09	5.92	0.02
Geo St S	0	4	12	37	0.58	0.81	0.96	1	23.86	12.29	19.5	58.22
terminal S	86	45	450	598	1	1	1	1	93.72	48.38	481.29	639.65

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1	0	0	0	9988	4209	9774	6495
Geo St T	1	0	0	0	9988	4209	9774	6495
North N	1	0	0	0	9988	4209	6113	5382
Centr N	2	0	0	0	9988	4209	6113	5382
WCVI N	1	0	0	1	552	856	6113	5382
J De F N	0	0	0	0	9988	4209	6113	5382
terminal N	0	0	0	0	552	856	6113	5382
John St N	0	0	0	0	9988	4209	6113	5382
Fraser N	1	0	0	0	9988	4209	9774	6495
Geo St S	74	16	5	4	9988	4209	9774	6495
terminal S	7	3	31	41	552	856	6113	5382

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	48	24	33	11	0.004	0.049	0.064	0.036
Geo St T	39	14	4	1	0.004	0.001	0	0
North N	15	44	157	200	0.001	0.01	0.031	0.046
Centr N	46	17	76	33	0.003	0.004	0.015	0.007
WCVI N	0	0	0	0	0.469	0.469	0.469	0.469
J De F N	11	9	5	0	0.001	0.002	0.001	0
terminal N	0	0	0	0	0	0	0	0
John St N	21	9	46	212	0.002	0.002	0.008	0.044
Fraser N	0	0	0	0	0	0	0.001	0
Geo St S	31	7	2	1	0.002	0.003	0.002	0.009
terminal S	0	0	0	0	0.17	0.057	0.079	0.119

For the fisheries (below) with external AEQ harvest rates,  
the base period exploitation rates shown above are from external AEQ harvest rates and  
a revised AEQ total mortality was calculated from the following external AEQ harvest rates and nominal terminal runs

fishery	(15) external AEQ HR				(16) nominal terminal run				(17) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WCVI N	0.38	0.38	0.38	0.38	552	856	6113	5382	207.9	322.67	2304.16	2028.6

(8) sum of AEQ total mortality = 7327.53  
(9) sum of cohort X AEQ BPER = 9578.32  
(10) Canada ISBM = 0.77



**TABLE 4.6(D): BASE PERIOD EXPLOITATION RATES FOR WCVI NATURALS IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	200	9617	1327	254	575	3946	6626	151	224	12171	2566	573	201	4836	8920	465
Geo St T	0	87	0	0	0	36	0	0	0	110	0	0	0	44	0	0
North N	17	2130	308	197	49	874	1740	117	19	2696	398	439	17	1071	1672	379
Centr N	339	773	148	32	975	317	838	19	379	978	192	72	341	389	805	62
WCVI N	175	1537	902	683	221	813	5091	405	50	1347	1166	1522	43	688	4890	1313
J De F N	61	410	10	0	176	168	56	0	68	519	13	0	61	206	54	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	146	363	82	189	419	149	465	112	163	459	107	421	147	182	447	363
Fraser N	0	0	13	0	0	0	64	0	0	0	25	0	0	0	87	0
Geo St S	105	568	39	61	302	233	196	36	118	719	76	136	20	283	263	110
terminal S	2688	1711	722	481	3387	905	4073	285	760	1500	933	1071	661	766	3913	924

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	568	671	28	5	1525	261	136	3	667	881	54	11	583	342	186	9
Geo St T	676	50	0	1	1741	19	1	0	655	56	1	1	544	20	2	1
North N	118	21	0	0	294	7	1	0	131	26	0	0	112	10	1	0
Centr N	243	65	0	0	648	25	2	0	216	66	1	1	174	23	2	1
WCVI N	48	5	0	1	90	4	3	0	16	5	0	1	21	4	3	2
J De F N	62	5	0	0	165	2	0	0	67	6	0	0	59	2	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	143	31	0	1	375	12	1	0	127	31	0	2	91	10	1	2
Fraser N	12	6	0	0	28	2	0	0	9	5	0	0	8	2	0	0
Geo St S	14	39	3	4	38	16	17	2	14	50	6	9	1302	31	20	9
terminal S	228	119	50	33	287	63	281	20	64	104	64	74	55	53	270	64

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391	137102	13216
Geo St T	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391	137102	13216
North N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391	53132	8307
Centr N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391	53132	8307
WCVI N	17158	32388	9802	4322	21618	17131	55308	2559	4852	28385	12664	9629	4219	14498	53132	8307
J De F N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391	53132	8307
terminal N	17158	32388	9802	4322	21618	17131	55308	2559	4852	28385	12664	9629	4219	14498	53132	8307
John St N	100020	167832	9802	4322	287866	68869	55308	2559	111968	212414	12664	9629	100754	84391	53132	8307
Fraser N	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391	137102	13216
Geo St S	100020	167832	20393	7227	287866	68869	101851	4277	111968	212414	39445	16268	100754	84391	137102	13216
terminal S	17158	32388	9802	4322	21618	17131	55308	2559	4852	28385	12664	9629	4219	14498	53132	8307

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.005	0.05	0.064	0.036	0.004	0.049	0.065	0.036	0.005	0.048	0.063	0.036	0.004	0.049	0.063	0.036
Geo St T	0.004	0.001	0	0	0.003	0.001	0	0	0.003	0.001	0	0	0.003	0.001	0	0
North N	0.001	0.01	0.031	0.046	0.001	0.01	0.031	0.046	0.001	0.01	0.031	0.046	0.001	0.01	0.031	0.046
Centr N	0.004	0.004	0.015	0.007	0.003	0.004	0.015	0.007	0.003	0.004	0.015	0.008	0.003	0.004	0.015	0.008
WCVI N	0.013	0.048	0.092	0.158	0.014	0.048	0.092	0.158	0.014	0.048	0.092	0.158	0.015	0.048	0.092	0.158
J De F N	0.001	0.002	0.001	0	0.001	0.002	0.001	0	0.001	0.002	0.001	0	0.001	0.002	0.001	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.002	0.002	0.008	0.044	0.002	0.002	0.008	0.044	0.001	0.002	0.008	0.044	0.001	0.002	0.008	0.044
Fraser N	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0	0	0	0.001	0
Geo St S	0.001	0.003	0.002	0.009	0.001	0.003	0.002	0.009	0.001	0.003	0.002	0.009	0.007	0.003	0.002	0.009
terminal S	0.17	0.057	0.079	0.119	0.17	0.057	0.079	0.119	0.17	0.057	0.079	0.119	0.17	0.057	0.079	0.119

**TABLE 4.7(C): DATA AND COMPUTATION FLOW (FIGURE 7) FOR 2003 NORTHERN BC PRESEASON CANADIAN ISBM INDEX**

Fishery	(1) 2003 legal catch (ccc file)				(4) AEQ for all years				(7) cohort X base period exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	8	45	15	9	0.59	0.81	0.97	1	1378.46	5188.16	1286.84	680.12
Geo St T	0	0	0	0	0.59	0.81	0.97	1	0	0	0	0
North N	542	485	360	213	0.59	0.81	1	1	3871.95	4528.12	4146.54	2449.53
Centr N	235	301	172	20	0.59	0.81	1	1	1862.5	2663.05	1847.92	213.7
WCVI N	0	0	504	0	0.59	0.81	1	1	0	0	797.04	5.41
J De F N	17	0	0	0	0.59	0.81	1	1	479.26	4.44	0	0
terminal N	0	0	0	0	1	1	1	1	0	0	0	0
John St N	0	1	0	0	0.59	0.81	1	1	243.36	123.82	0	0
Fraser N	0	0	0	0	0.59	0.81	0.97	1	0	0	0	0
Geo St S	0	0	0	0	0.59	0.81	0.97	1	1488.17	5.36	3.07	1.02
terminal S	0	4840	64	338	1	1	1	1	392.22	5607.23	73.24	486.54

Fishery	(2) 2003 shaker mortality (CCC file)				(5) 2003 cohort (CCC file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	19	12	1	0	309994	198427	116568	37756
Geo St T	0	0	0	0	309994	198427	116568	37756
North N	44	3	0	0	309994	198427	89671	33738
Centr N	59	6	0	0	309994	198427	89671	33738
WCVI N	0	0	2	3	309994	198427	89671	33738
J De F N	5	0	0	0	309994	198427	89671	33738
terminal N	0	0	0	0	22079	34520	89671	33738
John St N	1	0	0	0	309994	198427	89671	33738
Fraser N	0	0	0	0	309994	198427	116568	37756
Geo St S	0	0	0	0	309994	198427	116568	37756
terminal S	178	335	4	23	22079	34520	89671	33738

Fishery	(3) 2003 CNR mortality (CCC file)				(6) base period exploitation rates			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	1498	992	133	34	0.004	0.026	0.011	0.018
Geo St T	0	0	0	0	0	0	0	0
North N	5024	4153	3069	1815	0.012	0.023	0.046	0.073
Centr N	2631	2697	1510	175	0.006	0.013	0.021	0.006
WCVI N	0	0	0	0	0	0	0.009	0
J De F N	718	5	0	0	0.002	0	0	0
terminal N	0	0	0	0	0	0	0	0
John St N	276	129	0	0	0.001	0.001	0	0
Fraser N	0	0	0	0	0	0	0	0
Geo St S	0	0	0	0	0.005	0	0	0
terminal S	0	0	0	0	0.018	0.162	0.001	0.014

(8) sum of AEQ total mortality =	27454.75
(9) sum of cohort X AEQ BPER =	39827.1
(10) Canada ISBM =	0.69

**TABLE 4.7(D): BASE PERIOD EXPLOITATION RATES FOR WCVI NORTHERN BC IN CANADIAN FISHERIES**

Fishery	(11) 1979 legal catch (ccc file)				1980 legal catch (ccc file)				1981 legal catch (ccc file)				1982 legal catch (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	324	3154	690	290	333	3360	729	293	344	3462	777	310	405	3573	799	330
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	3449	3075	2112	796	3546	3276	2232	805	3662	3375	2375	844	4317	3483	2412	899
Centr N	1394	1780	940	69	1434	1896	993	70	1481	1954	1057	73	1746	2016	1073	78
WCVI N	0	0	404	0	0	0	427	0	0	0	455	0	0	0	462	0
J De F N	349	0	0	0	358	0	0	0	370	0	0	0	436	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	25	68	0	0	26	72	0	0	26	74	0	0	31	77	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	984	0	0	0	1011	0	0	0	1044	0	0	0	234	0	0	0
terminal S	0	2666	35	147	0	2841	37	149	0	2927	39	158	0	3020	40	168

Fishery	(12) 1979 shakers (ccc file)				1980 shakers (ccc file)				1981 shakers (ccc file)				1982 shakers (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	972	384	27	6	933	386	27	6	1083	440	31	7	1240	442	32	7
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	203	14	1	0	180	13	1	0	212	15	1	0	238	15	1	0
Centr N	415	42	2	1	397	42	2	1	351	37	2	1	370	34	2	1
WCVI N	0	0	1	1	0	0	2	2	0	0	2	2	0	0	3	3
J De F N	106	3	0	0	101	3	0	0	109	3	0	0	126	3	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	244	20	0	0	230	20	0	0	206	18	0	0	193	14	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	79	0	2	0	80	0	2	0	82	0	2	0	2784	17	1	2
terminal S	291	186	2	10	264	198	3	10	228	203	3	11	191	209	3	12

Fishery	(13) 1979 cohort (ccc file)				1980 cohort (ccc file)				1981 cohort (ccc file)				1982 cohort (ccc file)			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	171306	109310	62908	16439	176148	116463	66478	16624	181904	119982	70891	17571	214455	123820	72840	18699
Geo St T	171306	109310	62908	16439	176148	116463	66478	16624	181904	119982	70891	17571	214455	123820	72840	18699
North N	171306	109310	45693	10966	176148	116463	48295	11091	181904	119982	51396	11627	214455	123820	52185	12376
Centr N	171306	109310	45693	10966	176148	116463	48295	11091	181904	119982	51396	11627	214455	123820	52185	12376
WCVI N	171306	109310	45693	10966	176148	116463	48295	11091	181904	119982	51396	11627	214455	123820	52185	12376
J De F N	171306	109310	45693	10966	176148	116463	48295	11091	181904	119982	51396	11627	214455	123820	52185	12376
terminal N	12878	17576	45693	10966	13267	18742	48295	11091	13691	19258	51396	11627	16074	19833	52185	12376
John St N	171306	109310	45693	10966	176148	116463	48295	11091	181904	119982	51396	11627	214455	123820	52185	12376
Fraser N	171306	109310	62908	16439	176148	116463	66478	16624	181904	119982	70891	17571	214455	123820	72840	18699
Geo St S	171306	109310	62908	16439	176148	116463	66478	16624	181904	119982	70891	17571	214455	123820	72840	18699
terminal S	12878	17576	45693	10966	13267	18742	48295	11091	13691	19258	51396	11627	16074	19833	52185	12376

Fishery	(14) 1979 exploitation rate				1980 exploitation rate				1981 exploitation rate				1982 exploitation rate			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0.004	0.026	0.011	0.018	0.004	0.026	0.011	0.018	0.005	0.026	0.011	0.018	0.005	0.026	0.011	0.018
Geo St T	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North N	0.013	0.023	0.046	0.073	0.012	0.023	0.046	0.073	0.013	0.023	0.046	0.073	0.012	0.023	0.046	0.073
Centr N	0.006	0.013	0.021	0.006	0.006	0.013	0.021	0.006	0.006	0.013	0.021	0.006	0.006	0.013	0.021	0.006
WCVI N	0	0	0.009	0	0	0	0.009	0	0	0	0.009	0	0	0	0.009	0
J De F N	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0	0.002	0	0	0
terminal N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
John St N	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0	0.001	0.001	0	0
Fraser N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geo St S	0.004	0	0	0	0.004	0	0	0	0.004	0	0	0	0.008	0	0	0
terminal S	0.023	0.162	0.001	0.014	0.02	0.162	0.001	0.014	0.017	0.163	0.001	0.014	0.012	0.163	0.001	0.014

## APPENDIX 5: CALCULATION OF POSTSEASON ISBM INDEX FOR PUGET SOUND STOCKS

Table 5.1(a). Data and computational flow (Figure 13) for 2003 Green PSN postseason US ISBM index.

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	5	28	6	0	511	637	96	0	0.01	0.03	0.01	0	3.03	18.3	0.57
PgtNth N	0	0	0	0	0	69	327	57	0.08	0.33	0.04	0.05	0	22.79	13.48	2.62
PgtSth N	0	3	38	4	0	69	327	57	0.44	0.21	0.24	0.29	0	14.74	79.3	16.3
Wash Cst N	0	0	0	0	0	511	327	57	0	0	0	0	0	0	0	0
Col R N	0	19	117	26	0	69	327	57	0.02	0.1	0.16	0.09	0	6.98	52.55	4.91
Wash Ocn S	0	3	0	0	0	511	637	96	0	0	0	0	0	0.38	0.28	0
PgtNth S	0	14	30	0	0	511	637	96	0	0.01	0.05	0.01	0	7.64	31.37	0.85
PgtSth S	0	18	38	11	0	511	637	96	0.03	0.06	0.06	0.06	0	30.64	37.02	5.87
Col R S	0	0	0	0	0	69	327	57	0	0	0	0	0	0	0	0
(7) sum of AEQ total mortality =				360												
(8) sum of cohort X AEQ BPER =				349.63												
(9) US ISBM =				1.030												

Table 5.1(b). Data and computational flow (Figure 13) for 2003 Green PSN postseason Canada ISBM index.

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	0	511	637	96	0	0	0.02	0	0	1.45	9.84	0
Geo St T	0	0	0	0	0	511	637	96	0	0	0.02	0	0	2.03	12.44	0
Centr N	0	0	0	0	0	511	327	57	0	0	0	0	0	0.8	0	0
WCVI N	0	0	0	0	0	511	327	57	0	0.01	0	0	0	5	0.84	0
J De F N	0	0	0	0	0	511	327	57	0	0	0	0	0	1.52	0	0
Col R N	0	19	117	26	0	69	327	57	0.02	0.1	0.16	0.09	0	6.98	52.55	4.91
John St N	0	0	0	0	0	511	327	57	0	0	0.01	0	0	1.75	4.39	0
Fraser N	0	0	0	0	0	511	327	57	0	0	0	0	0	0	0	0
Geo St S	0	18	17	0	0	511	637	96	0.01	0.06	0.06	0.03	0	28.94	35.06	2.56
Col R S	0	0	0	0	0	69	327	57	0	0	0	0	0	0	0	0
(7) sum of AEQ total mortality =				35												
(8) sum of cohort X AEQ BPER =				106.62												
(9) Canada ISBM =				0.328												

## APPENDIX 6: CALCULATION OF POSTSEASON ISBM INDEX FOR COLUMBIA RIVER STOCKS

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**TABLE 6.1: DATA AND COMPUTATION FLOW FOR 2003 LRW POST SEASON US ISBM INDEX (FIGURE 13)**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1	4	37	7	132	193	703	70	0	0.01	0.02	0	0.21	2.66	14.48	0
PgtNth N	0	0	0	0	132	193	229	51	0	0	0	0	0.19	0.39	0	0
PgtSth N	0	0	0	0	132	193	229	51	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	132	193	229	51	0	0	0.02	0	0.07	0	4.07	0
Col R N	0	10	18	2	8	18	229	51	0.1	0.11	0.04	0.08	0.84	1.98	8.75	4.22
Wash Ocn S	0	0	5	0	132	193	703	70	0	0.02	0.02	0.02	0.48	3.03	16.98	1.51
PgtNth S	0	0	0	0	132	193	703	70	0	0	0	0	0.07	0.4	0	0
PgtSth S	0	0	0	0	132	193	703	70	0	0	0	0	0.16	0.22	0	0
Col R S	0	0	28	0	8	18	229	51	0.47	0.26	0.12	0.21	3.73	4.65	28.36	10.9
(7) sum of AEQ total mortality =				112												
(8) sum of cohort X AEQ BPER =				108.35												
(9) US ISBM =				1.034												

**TABLE 6.2: DATA AND COMPUTATION FLOW FOR 2003 URB POST SEASON US ISBM INDEX (FIGURE 13)**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1	5	10	2	2619	1048	2825	862	0	0	0.01	0	1.31	3	19.88	2.5
PgtNth N	0	0	0	0	2619	1048	1408	608	0	0	0	0	0	0	0	0
PgtSth N	0	1	0	0	2619	1048	1408	608	0	0	0	0	0	0	0.94	0
Wash Cst N	0	0	0	0	2619	1048	1408	608	0	0	0	0	0	0	0.43	0
Col R N	6	30	215	88	90	156	1408	608	0.04	0.17	0.18	0.06	3.36	26.8	252.53	36.9
Wash Ocn S	0	3	7	3	2619	1048	2825	862	0	0	0	0	0.44	5.07	12.87	3.02
PgtNth S	0	5	0	0	2619	1048	2825	862	0	0	0	0	0.26	2.4	0.81	1.03
PgtSth S	0	0	0	0	2619	1048	2825	862	0	0	0	0	0.26	0.49	0	0
Col R S	19	10	95	45	90	156	1408	608	0.01	0	0	0.01	1.18	0.47	2.02	3.19
(7) sum of AEQ total mortality =				545												
(8) sum of cohort X AEQ BPER =				381.15												
(9) US ISBM =				1.43												

**TABLE 6.3: DATA AND COMPUTATION FLOW FOR 2003 DESCHUTES POST SEASON US ISBM INDEX (FIGURE 13)**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	1	5	10	2	2619	1048	2825	862	0	0	0.01	0	1.31	3	19.88	1.88
PgtNth N	0	0	0	0	2619	1048	1408	608	0	0	0	0	0	0	0	0
PgtSth N	0	1	0	0	2619	1048	1408	608	0	0	0	0	0	0	0.94	0
Wash Cst N	0	0	0	0	2619	1048	1408	608	0	0	0	0	0	0	0.43	0
Col R N	6	30	215	88	90	156	1408	608	0.16	0.16	0.16	0.16	4.1	6.56	50.84	21.81
Wash Ocn S	0	3	7	3	2619	1048	2825	862	0	0	0	0	0.44	5.07	12.87	2.26
PgtNth S	0	5	0	0	2619	1048	2825	862	0	0	0	0	0.26	2.4	0.81	0.77
PgtSth S	0	0	0	0	2619	1048	2825	862	0	0	0	0	0.26	0.49	0	0
Col R S	19	10	95	45	90	156	1408	608	0.25	0.25	0.25	0.25	6.33	10.12	78.43	33.65

For the fisheries (below) with external AEQ harvest rates,  
replace the total AEQ mortality (above) with the revised total AEQ mortality (below)  
The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run

fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Col R N	0.07	0.07	0.07	0.07	25	40	310	133	2	3	23	10
Col R S	0.11	0.11	0.11	0.11	25	40	310	133	3	4	33	14

(7) sum of AEQ total mortality = 129  
(8) sum of cohort X AEQ BPER = 264.9  
(9) US ISBM = 0.487

**TABLE 6.4: DATA AND COMPUTATION FLOW FOR 2003 COLUMBIA UPRIVER SUMMERS POST SEASON US ISBM INDEX (FIGURE 13)**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	6	144	343	33	1042	1483	6756	0	0	0	0	0	4.43	6.06	0
PgtNth N	0	0	0	0	33	1042	263	2095	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	33	1042	263	2095	0	0	0	0	0	0	0	5.41
Wash Cst N	0	0	0	0	33	1042	263	2095	0	0	0	0	0	0	0	0
Col R N	0	0	14	192	0	44	263	2095	0.11	0.08	0.06	0	0	3.52	14.95	0
Wash Ocn S	0	7	25	45	33	1042	1483	6756	0	0	0.03	0	0	3.31	38.08	0
PgtNth S	0	5	0	0	33	1042	1483	6756	0	0	0	0	0	0	0	0
PgtSth S	0	0	0	0	33	1042	1483	6756	0	0	0	0	0	0	0	0
Col R S	0	19	90	204	0	44	263	2095	0	0	0	0	0	0	0	0

(7) sum of AEQ total mortality = 575  
(8) sum of cohort X AEQ BPER = 57.3  
(9) US ISBM = 10.04

## APPENDIX 7: CALCULATION OF POSTSEASON ISBM INDEX FOR WASHINGTON AND OREGON COAST STOCKS

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**Table 7.1. Data and computational flow (Figure 13) for 2003 Grays QUE postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	6	0	124	217	465	0.47	0.47	0.47	0.47	0	57.88	101.28	217.04
Col R N	0	32	127	141	0	124	217	465	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	7	4	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	5.75	0	0
PgtSth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
Col R S	0	0	0	0	0	124	217	465	0	0	0	0	0	0	0	0
(7) sum of AEQ total mortality =				23												
(8) sum of cohort X AEQ BPER =				148.58												
(9) US ISBM =				0.155												

**Table 7.2. Data and computational flow (Figure 13) for 2003 Queets QUE postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	6	0	124	217	465	0	0.16	0.15	0	0	19.48	31.53	0
Col R N	0	32	127	141	0	124	217	465	0	0.23	0.37	0.44	0	28.31	80.17	206.67
Wash Ocn S	0	0	7	4	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	7.66	0	0
PgtSth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
Col R S	0	0	0	0	0	124	217	465	0	0	0	0	0	0	0	0
(7) sum of AEQ total mortality =				317												
(8) sum of cohort X AEQ BPER =				373.83												
(9) US ISBM =				0.848												

**Table 7.3. Data and computational flow (Figure 13) for 2003 HOH QUE postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	6	0	124	217	465	0.22	0.22	0.22	0.22	0	7.12	28.26	32.71
Col R N	0	32	127	141	0	124	217	465	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	7	4	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	5.75	0	0
PgtSth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
Col R S	0	0	0	0	0	124	217	465	0	0	0	0	0	0	0	0
For the fisheries (below) with external AEQ harvest rates, replace the total AEQ mortality (above) with the revised total AEQ mortality (below) The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run																
fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Wash Cst N	0.29	0.29	0.29	0.29	0	32	127	147	0	9	37	42				
Col R N	0	0	0	0	0	32	127	147	0	0	0	0				
Col R S	0	0	0	0	0	32	127	147	0	0	0	0				
(7) sum of AEQ total mortality = 99																
(8) sum of cohort X AEQ BPER = 73.84																
(9) US ISBM = 1.341																

**Table 7.4. Data and computational flow (Figure 13) for 2003 Quillayute QUE postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	2	2219	217	465	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	6	0	124	217	465	0.24	0.24	0.24	0.24	0	7.61	30.19	34.95
Col R N	0	32	127	141	0	124	217	465	0	0	0	0	0	0	0	0
Wash Ocn S	0	0	7	4	2	2219	1001	1195	0	0	0	0	0	0	0	0
PgtNth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	5.75	0	0
PgtSth S	0	0	0	0	2	2219	1001	1195	0	0	0	0	0	0	0	0
Col R S	0	0	0	0	0	124	217	465	0	0	0	0	0	0	0	0
For the fisheries (below) with external AEQ harvest rates, replace the total AEQ mortality (above) with the revised total AEQ mortality (below) The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run																
fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Wash Cst N	0.22	0.22	0.22	0.22	0	32	127	147	0	7	28	32				
Col R N	0	0	0	0	0	32	127	147	0	0	0	0				
Col R S	0	0	0	0	0	32	127	147	0	0	0	0				
(7) sum of AEQ total mortality = 78																
(8) sum of cohort X AEQ BPER = 78.5																
(9) US ISBM = 0.994																

**Table 7.5. Data and computational flow (Figure 13) for 2003 Nehalem ORC postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	31	21	13	221	4856	4107	860	0	0.01	0	0.02	0.17	26.06	5.36	13.96
PgtNth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Col R N	0	0	0	0	14	502	1238	461	0	0	0	0	0	0	0	0
Wash Ocn S	0	41	78	5	221	4856	4107	860	0	0	0	0	0.37	4.6	12.4	0
PgtNth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0.15	0	0	0
PgtSth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0	0	0	0
Col R S	8	361	961	327	14	502	1238	461	0.08	0.08	0.08	0.08	0.62	28.07	74.72	25.42
For the fisheries (below) with external AEQ harvest rates, replace the total AEQ mortality (above) with the revised total AEQ mortality (below) The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run																
fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Col R N	0	0	0	0	8	361	961	327	0	0	0	0				
Col R S	0.25	0.25	0.25	0.25	8	361	961	327	2	89	236	80				
(7) sum of AEQ total mortality = 596																
(8) sum of cohort X AEQ BPER = 191.9																
(9) US ISBM = 3.106																

**Table 7.6. Data and computational flow (Figure 13) for 2003 Siletz ORC postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	31	21	13	221	4856	4107	860	0	0.01	0	0.02	0.17	26.06	5.36	13.96
PgtNth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Col R N	0	0	0	0	14	502	1238	461	0	0	0	0	0	0	0	0
Wash Ocn S	0	41	78	5	221	4856	4107	860	0	0	0	0	0.37	4.6	12.4	0
PgtNth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0.15	0	0	0
PgtSth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0	0	0	0
Col R S	8	361	961	327	14	502	1238	461	0.24	0.24	0.24	0.24	1.96	88.26	234.96	79.95

For the fisheries (below) with external AEQ harvest rates,  
 replace the total AEQ mortality (above) with the revised total AEQ mortality (below)  
 The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run

fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Col R N	0	0	0	0	8	361	961	327	0	0	0	0
Col R S	0.34	0.34	0.34	0.34	8	361	961	327	3	121	323	110

(7) sum of AEQ total mortality = 746  
 (8) sum of cohort X AEQ BPER = 468.21  
 (9) US ISBM = 1.593

**Table 7.7. Data and computational flow (Figure 13) for 2003 Siuslaw SRH postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	31	21	13	221	4856	4107	860	0	0.01	0	0.02	0.17	26.06	5.36	13.96
PgtNth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
PgtSth N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	221	4856	1238	461	0	0	0	0	0	0	0	0
Col R N	0	0	0	0	14	502	1238	461	0	0	0	0	0	0	0	0
Wash Ocn S	0	41	78	5	221	4856	4107	860	0	0	0	0	0.37	4.6	12.4	0
PgtNth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0.15	0	0	0
PgtSth S	0	0	0	0	221	4856	4107	860	0	0	0	0	0	0	0	0
Col R S	8	361	961	327	14	502	1238	461	0.06	0.06	0.06	0.06	0.48	21.48	57.18	19.46
For the fisheries (below) with external AEQ harvest rates, replace the total AEQ mortality (above) with the revised total AEQ mortality (below) The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run																
fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
Col R N	0	0	0	0	8	361	961	327	0	0	0	0				
Col R S	0.26	0.26	0.26	0.26	8	361	961	327	2	93	249	85				
(7) sum of AEQ total mortality =				618												
(8) sum of cohort X AEQ BPER =				161.66												
(9) US ISBM =				3.823												

## APPENDIX 8: CALCULATION OF POSTSEASON ISBM INDEX FOR CANADIAN STOCKS

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**Table 8.1(a). Data and computational flow (Figure 13) for 2003 Cowichan GST postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	0	0	2	0	647	222	180	4	0	0	0	0	0	0	0	0
PgtNth N	23	5	3	0	647	222	45	0	0	0	0.02	0	0.89	0.54	0.84	0
PgtSth N	0	0	0	0	647	222	45	0	0	0	0	0	0	0	0	0
Wash Cst N	0	0	0	0	647	222	45	0	0	0	0	0	0.09	0.18	0	0
terminal N	0	0	0	0	95	35	45	0	0	0	0	0	0	0	0	0
Wash Ocn S	0	3	0	0	647	222	180	4	0	0	0	0	0.89	0	0.56	0
PgtNth S	3	8	0	0	647	222	180	4	0.01	0	0.01	0	3.72	0.33	1.39	0
PgtSth S	0	0	0	0	647	222	180	4	0	0	0	0	0	0	0	0
terminal S	1	7	3	0	95	35	45	0	0.14	0.16	0.06	0.14	12.93	5.61	2.71	0

For the fisheries (below) with external AEQ harvest rates,  
 replace the total AEQ mortality (above) with the revised total AEQ mortality (below)  
 The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run

fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Col R N	0.2	0.2	0.2	0.2	1	7	3	0	0	1	1	0

the base period exploitation rates for all ages and fisheries were obtained from the STK file.

(7) sum of AEQ total mortality = 47  
 (8) sum of cohort X AEQ BPER = 9.41  
 (9) US ISBM = 4.993



**Table 8.1(b). Data and computational flow (Figure 13) for 2003 Cowichan GST postseason Canada ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	4	2	13	0	647	222	180	4	0	0.09	0.05	0.04	0.21	19.68	9.88	0.17
Geo St T	0	0	0	0	647	222	180	4	0.06	0.18	0.09	0.1	38.29	40.89	16.51	0.39
Centr N	0	0	0	0	647	222	45	0	0.04	0.01	0.03	0.17	27.42	2.52	1.41	0
WCVI N	0	0	0	0	647	222	45	0	0	0	0	0	0.25	0.14	0	0
J De F N	0	0	0	0	647	222	45	0	0	0	0.01	0	0	0	0.24	0
terminal N	0	0	0	0	95	35	45	0	0	0	0	0	0	0	0	0
John St N	0	0	0	0	647	222	45	0	0.03	0.03	0.16	0.12	21.6	6.93	7.22	0
Fraser N	0	0	0	0	647	222	45	0	0	0	0	0	0.85	0	0	0
Geo St S	14	71	19	4	647	222	180	4	0.11	0.25	0.21	0.03	73.9	56.07	38.4	0.11
terminal S	1	7	3	0	95	35	45	0	0.14	0.16	0.06	0.14	12.93	5.61	2.71	0

For the fisheries (below) with external AEQ harvest rates,  
replace the total AEQ mortality (above) with the revised total AEQ mortality (below)  
The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run

fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Col R N	0.2	0.2	0.2	0.2	1	7	3	0	0	1	1	0

the base period exploitation rates for all ages and fisheries were obtained from the STK file.

(7) sum of AEQ total mortality = 140  
(8) sum of cohort X AEQ BPER = 384.33  
(9) Canada ISBM = 0.364

**Table 8.2. Data and computational flow (Figure 13) for 2003 QUI postseason Canada ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	441	1064	664	245	0.01	0.02	0.1	0.11	2.48	20.92	63.52	27.89
Geo St T	0	0	0	0	441	1064	664	245	0	0.01	0	0.02	0.4	6.16	2.42	4.4
Centr N	0	0	0	0	441	1064	202	99	0.02	0.03	0.15	0.15	7.97	29.7	30.3	15.07
WCVI N	0	0	0	0	441	1064	202	99	0	0	0	0.01	0	0	0	0.69
J De F N	0	0	0	0	441	1064	202	99	0	0	0	0	0.21	0.19	0	0
terminal N	0	0	0	0	1	50	202	99	0	0	0	0	0	0	0	0
John St N	0	0	0	0	441	1064	202	99	0	0.01	0.24	0.22	2.02	7.09	47.48	22.12
Fraser N	0	0	0	0	441	1064	202	99	0	0	0	0	0	0	0	0
Geo St S	0	2	0	0	441	1064	664	245	0	0	0.03	0.1	0.96	4.72	18.06	25.46
terminal S	0	0	0	0	1	50	202	99	0	0	0	0	0	0	0	0
(7) sum of AEQ total mortality =				2												
(8) sum of cohort X AEQ BPER =				340.21												
(9) Canada ISBM =				0.006												

**Table 8.3(a). Data and computational flow (Figure 13) for 2003 FRL postseason US ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
WA/OR T	14	90	276	7	2680	3255	3761	112	0	0.08	0.03	0	5.66	256.06	130.21	0
PgtNth N	0	0	0	0	2680	3255	2616	105	0.01	0	0.01	0	35.03	9.99	23.98	0
PgtSth N	4	4	0	0	2680	3255	2616	105	0.01	0	0	0	19.46	3.53	0	0
Wash Cst N	1	5	0	0	2680	3255	2616	105	0	0	0	0	11.12	9.4	0	0
terminal N	0	0	0	0	205	843	2616	105	0	0	0	0	0	0	0	0
Wash Ocn S	10	16	20	0	2680	3255	3761	112	0.01	0.02	0.01	0.01	13.9	55.82	20.79	1
PgtNth S	1	7	0	0	2680	3255	3761	112	0.01	0	0	0	29.45	13.61	0	0
PgtSth S	5	17	0	0	2680	3255	3761	112	0.03	0.01	0	0	80.81	22.6	4.1	0
terminal S	44	100	299	14	205	843	2616	105	0	0	0	0	0	0	0	0
For the fisheries (below) with external AEQ harvest rates, replace the total AEQ mortality (above) with the revised total AEQ mortality (below) The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run																
fishery	(5) external AEQ HR				(6) nominal terminal run				(7) revised AEQ total mortality							
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5				
terminal S	0	0	0	0	44	105	303	14	0	0	0	0				
the base period exploitation rates for all ages and fisheries were obtained from the STK file.																
(7) sum of AEQ total mortality =				477												
(8) sum of cohort X AEQ BPER =				746.51												
(9) US ISBM =				0.639												

**Table 8.3(b). Data and computational flow (Figure 13) for 2003 FRL postseason Canada ISBM index.**

fishery	(1) total AEQ mortality					(2) cohort					(3) AEQ Base Period Exploitation Rates					(4) cohort X AEQ BPER				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
Centr T	0	0	0	0	0	2680	3255	3761	112		0	0.09	0.05	0.01		1.93	278.94	185.77	1.26	
Geo St T	0	0	0	0	0	2680	3255	3761	112		0.01	0.09	0.18	0		25.34	293.61	662.01	0.25	
Centr N	0	0	0	0	0	2680	3255	2616	105		0.01	0	0	0		24.04	4.19	0	0	
WCVI N	0	0	0	0	0	2680	3255	2616	105		0	0	0	0		2.32	4.62	0	0	
J De F N	0	0	0	0	0	2680	3255	2616	105		0	0	0	0		2.01	8.97	4.3	0	
terminal N	0	0	0	0	0	205	843	2616	105		0	0	0	0		0	0	0	0	
John St N	0	0	0	0	0	2680	3255	2616	105		0.01	0.01	0.01	0		20.73	32.81	19.36	0.24	
Fraser N	0	5	4	0	0	205	843	2616	105		0.48	0.35	0.02	0		98.77	291.92	51.69	0.49	
Geo St S	7	42	118	0	0	2680	3255	3761	112		0.05	0.14	0.17	0		127.98	440.75	627.56	0.5	
terminal S	44	100	299	14	0	205	843	2616	105		0	0	0	0		0	0	0	0	

For the fisheries (below) with external AEQ harvest rates,  
replace the total AEQ mortality (above) with the revised total AEQ mortality (below)  
The revised AEQ total mortality = external AEQ harvest rate X nominal terminal run

fishery	(5) external AEQ HR					(6) nominal terminal run					(7) revised AEQ total mortality				
	age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5		age-2	age-3	age-4	age-5	
terminal S	0	0	0	0	0	44	105	303	14		0	0	0	0	

the base period exploitation rates for all ages and fisheries were obtained from the STK file.

(7) sum of AEQ total mortality = 176  
(8) sum of cohort X AEQ BPER = 3212.38  
(9) Canada ISBM = 0.055

**Table 8.4. Data and computational flow (Figure 13) for 2003 WCVI postseason Canada ISBM index.**

fishery	(1) total AEQ mortality				(2) cohort				(3) AEQ Base Period Exploitation Rates				(4) cohort X AEQ BPER			
	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5	age-2	age-3	age-4	age-5
Centr T	0	0	0	0	5400	4512	2729	335	0.01	0.04	0.07	0.06	29.41	173.17	181.48	19.45
Geo St T	0	0	0	0	5400	4512	2729	335	0	0	0	0	0	3.35	0	0
Centr N	0	0	0	0	5400	4512	1198	185	0	0.01	0.04	0.01	16.46	36.19	50.83	1.95
WCVI N	0	0	0	0	5400	4512	1198	185	0	0	0.01	0	6.9	3.38	8.79	0
J De F N	0	0	0	0	5400	4512	1198	185	0	0	0	0	1.28	7.63	0.63	0
terminal N	1	13	63	7	153	680	1198	185	0.09	0.26	0.26	0.21	13.33	178.01	316.52	38.78
John St N	0	0	0	0	5400	4512	1198	185	0	0	0.02	0.05	6.62	5.38	18.78	8.44
Fraser N	0	0	0	0	5400	4512	1198	185	0	0	0	0	0	0	0.93	0
Geo St S	1	10	4	0	5400	4512	2729	335	0	0	0	0.01	0	13.14	4.01	2.68
terminal S	24	172	391	34	153	680	1198	185	0.1	0.12	0.15	0.16	14.81	78.44	179.52	30.23
(7) sum of AEQ total mortality =				720												
(8) sum of cohort X AEQ BPER =				1450.53												
(9) Canada ISBM =				0.496												

## APPENDIX 9: USER GUIDE TO CALCULATION OF POST-SEASON ISBM INDICES FOR STOCKS WITHOUT EXTERNAL HARVEST RATES.

The post-season ISBM indices for stocks without external harvest rates are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input data	output
*b1.hrj and *c1.hrj files	Text file		
Comp_ISBM_CWT	VB.net program	CWT	PT file

Run COHSHK.vb to generate the \*B1.HJR and \*C1.HRJ file. Note older HRJ files have 2 digit years.

Run comp\_ISBM\_cwt.vb, which will read the \*B1.HJR and \*C1.HRJ files. Do not use comp\_ISBM\_cwt.exe file because it is hardcoded for 2001. Instead, run comp\_ISBM\_cwt in the Integrated Development Environment (IDE). Search for *EndYear* (search hidden text) and update this line (notice the 3 digit year) before you run the program

```
Const EndYear As Short = 101
```

Select “pick stocks”, “CWT stock” (which will prompt you for an HRJ file), and finally “wild stock”. ). If there are not enough base years, the program will prompt you for the STK file (e.g. NKS, SKG, STL).

Stocks without external harvest rates	Need STK file
CHI	
COW	
WCVIRBT	
NKS	NKS
SKG	SKG
STL	STL
SUM	
URB	
QUI	
LRW	

The ISBM indices are found in the “.PT” files

## APPENDIX 10: USER GUIDE FOR CALCULATION OF POST-SEASON ISBM INDICES FOR STOCKS WITH EXTERNAL HARVEST RATES.

The post-season ISBM indices for stocks with external harvest rates are calculated using the spreadsheets, programs and files shown below.

Name of file	Type	Input data	output
Stk file	Text file		
*b1.hrf and *c1.hrf files	Text file		
termER.xls	Spreadsheet	Various sources	
*.hrt	Text file	termER.xls	
Comp ISBM CWT	VB.net program	CWT	PT file

Run COHSHK.vb to generate the \*B1.HJR and \*C1.HRJ file. Note older HRJ files have 2 digit years.

You will need the HRJ files for the stocks listed under “CWT stock code” and you will need the HRT files for the stocks listed under “wild stocks with terminal ER” (see table below).

Update the HRT files by adding a new column (representing the new year) with data from the following: Deschutes data comes from *colrwiz.xls* and *DeschutesreconstructionforisbmYYYY.xls* (see the preseason section below for details), Nehalem, Siletz, and Siuslaw are from preseason termER spreadsheet (see the preseason section above for details). The HRT files have the same information as termER.xls, except fishery codes in termER.xls are offset by 5, e.g. termER.xls 25 = HRT 30. Both have only terminal fisheries. Don't forget to increment the last year in row 7 (see illustration below).

**Siletz 01.hrt - WordPad**

File Edit View Insert

**number of terminal fisheries, including escapement**

3  
0, 20, 30

**0 = all fisheries, 20 = terminal net, 30 = terminal sport**

2  
20  
30

**number of fisheries with terminal harvest rates**

79  
101

**20 = terminal net, 30 = terminal sport**

	79	80	81	82	83	84	85	86	87	
20	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
20	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
20	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
20	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
30	.180	.220	.340	.240	.300	.230	.130	.120	.230	.150
30	.180	.220	.340	.240	.300	.230	.130	.120	.230	.150
30	.180	.220	.340	.240	.300	.230	.130	.120	.230	.150
30	.180	.220	.340	.240	.300	.230	.130	.120	.230	.150

**79 = first year, 101 = last year**

**for fishery 20, first row = age 2, second row = age 3, etc**

Run comp\_ISBM\_cwt.vb which will read the hrj and hrt files. Do not use compISBMcwt.exe file because it is hardcoded for 2001. Instead, run compISBMcwt in the Integrated Development Environment (IDE). Search for *EndYear* (search hidden text) and update this line (notice the 3 digit year)

```
Const EndYear As Short = 101
```

Select “Pick external HR file”, then “pick stocks”, “CWT stock” (which will prompt you for an HRJ file), and finally “wild stock” (see table below)

Relationship between “wild stocks with terminal ER” and CWT stocks when using the program named “*comp\_ISBM\_CWT*” for stocks with external harvest rates.

CWT Stock code	Wild stocks with terminal ER					
FRL	Harrison					
RBT	WCVI					
GST	Cowichan	Nanaimo				
PSN	Green	Lake Wash				
URB	Deschutes					
ORC	Nehalem	Siletz	Siuslaw			
WCN	Hoko	Greys	Queets	Quillayute	Hoh	

The ISBM indices are found in the “.PT” files

## APPENDIX 11: BASE PRIOD VERSUS CURRENT YEAR EXPLOITATION RATES

**Table 11.1: Base period Exploitation Rates for Cananda**

<b>stock</b>	<b>age2</b>	<b>age3</b>	<b>age4</b>	<b>age5</b>	<b>ERI</b>
Cowichan	0.19	0.36	0.31	0.30	0.29
FRL	0.28	0.34	0.21	0.01	0.21
GSQ	0.02	0.03	0.26	0.31	0.15
WCVI	0.10	0.22	0.27	0.25	0.21
Deschutes	0.21	0.21	0.22	0.21	0.22
Grays	0.00	0.00	0.00	0.00	0.00
GRN	0.02	0.09	0.13	0.06	0.07
Hoh	0.00	0.00	0.00	0.00	0.00
LRW	0.29	0.19	0.09	0.19	0.19
Nehalem	0.04	0.04	0.04	0.04	0.04
Queets	0.00	0.12	0.19	0.22	0.13
Quillayute	0.00	0.00	0.00	0.00	0.00
Siletz	0.12	0.12	0.12	0.12	0.12
Suislaw	0.03	0.03	0.03	0.03	0.03
SUM	0.07	0.06	0.06	0.02	0.05
URB	0.03	0.09	0.11	0.04	0.07

**Table 11.2: 2003 Exploitation Rates for Cananda**

<b>stock</b>	<b>age2</b>	<b>age3</b>	<b>age4</b>	<b>age5</b>	<b>ERI</b>
Cowichan	0.12	0.36	0.22	0.00	0.18
FRL	0.00	0.01	0.02	0.00	0.01
GSQ	0.00	0.00	0.00	0.00	0.00
WCVI	0.00	0.01	0.03	0.02	0.01
Deschutes	0.09	0.09	0.09	0.09	0.09
Grays	0.00	0.00	0.00	0.00	0.00
GRN	0.00	0.04	0.03	0.00	0.02
Hoh	0.00	0.00	0.00	0.00	0.00
LRW	0.00	0.00	0.00	0.00	0.00
Nehalem	0.12	0.12	0.12	0.12	0.12
Queets	0.00	0.00	0.00	0.00	0.00
Quillayute	0.00	0.00	0.00	0.00	0.00
Siletz	0.17	0.17	0.17	0.17	0.17
Suislaw	0.13	0.13	0.13	0.13	0.13
SUM	0.00	0.00	0.00	0.00	0.00
URB	0.00	0.00	0.00	0.00	0.00

**Table 11.3: Base period Exploitation Rates for USA**

<b>stock</b>	<b>age2</b>	<b>age3</b>	<b>age4</b>	<b>age5</b>	<b>ERI</b>
Cowichan	0.07	0.08	0.04	0.07	0.07
FRL	0.04	0.06	0.03	0.00	0.03
GSQ	0.00	0.00	0.00	0.00	0.00
WCVI	0.09	0.19	0.21	0.19	0.17
Deschutes	0.21	0.21	0.21	0.21	0.21
Grays	0.23	0.23	0.23	0.23	0.23



GRN	0.29	0.36	0.29	0.25	0.30
Hoh	0.11	0.11	0.11	0.11	0.11
LRW	0.29	0.20	0.11	0.16	0.19
Nehalem	0.04	0.04	0.04	0.05	0.04
Queets	0.00	0.19	0.26	0.22	0.17
Quillayute	0.12	0.12	0.12	0.12	0.12
Siletz	0.12	0.13	0.12	0.13	0.13
Suislaw	0.03	0.03	0.03	0.04	0.03
SUM	0.06	0.04	0.04	0.00	0.04
URB	0.03	0.09	0.10	0.04	0.06

**Table 11.4: 2003 Exploitation Rates for USA**

<b>stock</b>	<b>age2</b>	<b>age3</b>	<b>age4</b>	<b>age5</b>	<b>ERI</b>
Cowichan	0.12	0.23	0.17	0.00	0.15
FRL	0.01	0.02	0.04	0.03	0.02
GSQ	0.00	0.00	0.00	0.00	0.00
WCVI	0.00	0.01	0.03	0.02	0.01
Deschutes	0.09	0.10	0.09	0.09	0.09
Grays	0.00	0.00	0.00	0.01	0.00
GRN	0.00	0.12	0.27	0.25	0.18
Hoh	0.00	0.00	0.00	0.01	0.00
LRW	0.01	0.02	0.06	0.10	0.05
Nehalem	0.12	0.13	0.14	0.13	0.13
Queets	0.00	0.00	0.01	0.02	0.01
Quillayute	0.00	0.00	0.00	0.01	0.00
Siletz	0.17	0.18	0.18	0.18	0.18
Suislaw	0.13	0.14	0.14	0.14	0.14
SUM	0.00	0.02	0.11	0.06	0.05
URB	0.00	0.01	0.01	0.01	0.01

## **APPENDIX 12: EFFECT OF AVERAGE AEQ'S ON ISBM INDEX**

We developed a theoretical exercise for an analysis on incomplete versus complete broods. We used 2000 calendar year Upriver Brights as we had the AEQ and average AEQ for all 3 ages. In 2001 we would have only ages 3 and 4, and 2002 we would have only age 4. Thus the average method is compared to the theoretical complete brood (using 2000 Calendar year AEQ's and comparing them to average AEQ's derived prior to 2000 assuming 2000 is the current year). To follow the example the following are numbered.

- (1) the AEQ from the 2003 ERA assuming known AEQ's (equal to 2000 calendar year AEQ's)
- (2) the average AEQ for all year (using data prior to the return/ISBM year)
- (3) the ratio between the two
- (4) the sum and accumulated catch of the current year catch based on AEQ and average AEQ
- (5) the ISBM calculation using AEQ and average AEQ
- (6) the difference between the two.

return	(1) AEQ from COHSHK/HRJ files from 2003 exploitation rate analysis			(2) average based on all years prior to ISBM/return year from 2003 exploitation rate analysis slight differences with each new ERA			(3) ratio between AEQ and average AEQ from 2003 exploitation rate analysis slight differences with each new ERA		
	age2	age3	age4	avg2	avg3	avg4	avg2	avg3	avg4
1977	0.5706			0.5706					
1978	0.5459	0.7992		0.5706	0.7992				
1979	0.5988	0.7642	0.9529	0.5583	0.7992	0.9529	0.9323	1.0458	
1980	0.5939	0.8222	0.9385	0.5718	0.7817	0.9529	0.9627	0.9507	1.0153
1981	0.6173	0.8313	0.977	0.5773	0.7952	0.9457	0.9352	0.9566	0.9680
1982	0.5691	0.8544	0.9841	0.5853	0.8042	0.9561	1.0285	0.9413	0.9716
1983	0.5781	0.784	0.9618	0.5826	0.8143	0.9631	1.0078	1.0386	1.0014
1984	0.5792	0.8154	0.9475	0.5820	0.8092	0.9629	1.0048	0.9924	1.0162
1985	0.5905	0.8084	0.9664	0.5816	0.8101	0.9603	0.9849	1.0021	0.9937
1986	0.5968	0.8008	0.9629	0.5826	0.8099	0.9612	0.9762	1.0113	0.9982
1987	0.5506	0.8076	0.9539	0.5840	0.8089	0.9614	1.0607	1.0016	1.0078
1988	0.5906	0.7805	0.9612	0.5810	0.8088	0.9606	0.9837	1.0362	0.9993
1989	0.6073	0.799	0.9403	0.5818	0.8062	0.9606	0.9580	1.0090	1.0216
1990	0.5619	0.8092	0.9529	0.5837	0.8056	0.9588	1.0389	0.9955	1.0062
1991	0.5651	0.7898	0.9756	0.5822	0.8059	0.9583	1.0302	1.0203	0.9823
1992	0.5553	0.7847	0.9488	0.5810	0.8047	0.9596	1.0464	1.0255	1.0114
1993	0.5472	0.781	0.937	0.5794	0.8034	0.9588	1.0589	1.0287	1.0233
1994	0.595	0.7609	0.9504	0.5775	0.8020	0.9574	0.9707	1.0540	1.0074
1995	0.5974	0.832	0.9384	0.5785	0.7996	0.9570	0.9684	0.9610	1.0198
1996	0.5811	0.8324	0.9709	0.5795	0.8014	0.9559	0.9973	0.9627	0.9845
1997	0.5651	0.8147	0.9707	0.5796	0.8030	0.9567	1.0256	0.9856	0.9856
1998	0.6121	0.8003	0.9557	0.5789	0.8036	0.9574	0.9458	1.0041	1.0018
1999	0.5646	0.8498	0.9584	0.5804	0.8034	0.9573	1.0280	0.9454	0.9989
2000	0.5743	0.7976	0.979	0.5797	0.8055	0.9574	1.0094	1.0100	0.9779
2001	0.5795	0.817	0.9785	0.5795	0.8052	0.9584		0.9855	0.9794
2002	0.5795	0.8057	0.9532		0.8057	0.9593			1.0063
2003	0.5795	0.8057	0.959			0.9590			

AEQ used in example below  
Average AEQ used in example below  
average AEQ for most recent broods

(4) the sum and accum of the current year catch based on AEQ and average AEQ							(5) ISBM calculation using AEQ and average AEQ example using 2000 US ISBM index for URB: replace age 2, 3 and 4 AEQ (highlighted in blue) with :		
YR	fishery	age	AEQ catch	accum	average AEQ		sum current	sum base	index based on AEQ
					catch	revised accum			
2000	10	2	0	0	0	0	259	102.2848	2.532
2000	17	2	0	0	0	0			
2000	18	2	0	0	0	0			
2000	19	2	0	0	0	0			
2000	20	2	3	3	3.028299	3			
2000	26	2	0	3	0	3			
2000	27	2	0	3	0	3			
2000	28	2	0	3	0	3			
2000	30	2	8	11	8.075464	11			
2000	10	3	0	11	0	11			
2000	17	3	0	11	0	11			
2000	18	3	0	11	0	11			
2000	19	3	0	11	0	11			
2000	20	3	12	23	12.1194	23			
2000	26	3	0	23	0	23			
2000	27	3	0	23	0	23			
2000	28	3	0	23	0	23			
2000	30	3	0	23	0	23			
2000	10	4	0	23	0	23			
2000	17	4	0	23	0	23			
2000	18	4	0	23	0	23			
2000	19	4	0	23	0	23			
2000	20	4	125	148	122.2415	145			
2000	26	4	0	148	0	145			
2000	27	4	0	148	0	145			
2000	28	4	0	148	0	145			
2000	30	4	19	167	18.5807	164			
2000	10	5	3	170		167			
2000	17	5	0	170		167			
2000	18	5	0	170		167			
2000	19	5	0	170		167			
2000	20	5	71	241		238			
2000	26	5	2	243		240			
2000	27	5	0	243		240			

(6) change in index  
0.9886