OCSRI Plan
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Appendix III
POPULATION DYNAMICS OF OREGON COASTAL COHO SALMON: APPLICATION OF A HABITAT-BASED LIFE CYCLE MODEL

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Abstract: To evaluate the 100 year extinction risk for Oregon coastal natural (OCN) coho salmon, a habitat based life cycle model was developed. Individual stream reaches (ca. 1 km) were characterized by estimated maximum smolt density using habitat survey data covering 16 to 67 percent of basins. Smolt output was a function of spawners, egg to parr survival, and overwinter survival. After natural mortality and harvest in the ocean, spawners returned to their natal reach. At low stock size, spawners could fail to reproduce due to random demographic events of straying, return timing, sex ratio, and redd failure. Accumulation of deleterious alleles was modeled at low abundance. Only the higher productivity reaches remained viable with low marine survival. Therefore, distribution and abundance of fish was a function of long- and short-term variability in marine survival and long term patterns of habitat quality. Within a reach, populations were resilient unless numbers dropped to a level where demographic risk factors became more important than density dependent population dynamics. Persistence of populations in a basin during periods of poor marine survival depended on the highest quality reaches.

Introduction

Population dynamics of Oregon coastal natural (OCN) coho salmon have been investigated with stock-recruitment (e.g. Ricker 1975) functions, usually applied to large areas of the coast as a single stock (Beidler, et al. 1980, Overholtz 1994), or to individual streams or stream sections (Overholtz 1994). When applied to the stock aggregate, this approach has the advantage of describing the general behavior of the stock, but fails to describe stock dynamics at low abundance, cannot distinguish between freshwater and marine influences on survival, and uses only a small portion of available data. Production functions for single stream sections have little generality. This paper develops an alternative approach to understanding the dynamics of OCN coho salmon using fine scale freshwater habitat data as the basis for modeling freshwater production at the scale of individual river basins. Modeling production at a fine spatial scale allows us to incorporate metapopulation dynamics such as straying and depensatory demographic effects such as variable sex ratios and run timing which become important at low spawning escapements. Density-dependent survival occurs at the reach level, while more general effects, such as marine survival, affect whole populations.

The freshwater production model was used as the basis for simulations of OCN coho population patterns over time. We incorporated stochastic variability at many stages to represent the variability inherent in natural processes, and experimental measurement error in parameter estimation. This allowed us to estimate probability distributions of likely outcomes given specified starting conditions, which then enabled us to identify likely population sizes and extinction probabilities (Goodman, in press). Extinction probabilities are commonly expressed as likelihood of extinction in 100 years, with an acceptable risk level of 5 percent (Thompson 1991). Because this 5 percent represents the left tail of a probability distribution it is sensitive to the structure of the model and the parameters used to describe variability. To estimate extinction probabilities rigorously would require incorporating "everything that is known and everything that is not know about the *dynamics* of the population" (Goodman, in press). To the extent we have not achieved this ambitious goal, our results in this area must be viewed as exploratory.

The model was used to explore OCN coho salmon population dynamics at the basin scale. We used three basins of varying habitat quality to represent the range of conditions on the coast; Tillamook (poor), Coos (moderate) and Yaquina (good). We tested the sensitivity of populations in these three basins to varying levels of marine survival and exploitation rates over 10 generations. We simulated the effects of a range of starting population sizes, including the 1995 actual spawner escapements, on median population size and probability of extinction in 33 generations. We also modeled the effects of changes in habitat quality on persistence and population size after 33 generations.

Methods

A simulation model was developed that has both production and forward simulation aspects. The production aspect addresses differences in habitat quality and will subsequently be referred to as the habitat quality component. The basis for this component is that the quality of freshwater habitat, which varies both within and among watersheds, determines the number of coho salmon smolts that a stream produces as well as the efficiency with which those smolts are produced (*i.e.* survival rate). Production is estimated for individual stream reaches within a basin, based on habitat quality data from the basin.

Estimates of smolt capacities and average survival rates at densities associated with maximum smolt production were derived for ten large Oregon coastal basins. These estimates were made for individual stream reaches (lengths of stream between changes in gradient or valley and channel form) within each basin using data in the Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory Database (Moore et al. 1995) and data from the Siuslaw National Forest (Bob Metzger, Siuslaw National Forest, Corvallis, OR, personal communication June 1996), and represent sampling rates ranging from 16% to 64% of the available coho salmon habitat in each basin.

The temporal component of the model mimics the life cycle of coho salmon and simulates population fluctuation and random dispersal over generations by incorporating density driven compensation and depensation, short-term stochastic variation in survival, long-term climatic cycles, reduced genetic fitness because of small population size, and straying of spawners from their natal spawning areas.

The Habitat Quality Component of the Model

Estimates of Smolt Production Capacity

Estimates of smolt production capacity were derived for individual stream reaches in two ways, depending on the level of inventory data available.

For stream reaches where winter habitat data were available, the latest version of the habitat limiting factors model (HLFM Version 5.0) originally described by Nickelson et al. (1992a), was used to estimate smolt potential. This model estimates potential population abundance for the spawning, spring rearing, summer rearing, and winter rearing life stages of coho salmon by multiplying habitat-specific densities based on data from Nickelson et al. (1992b) by areas of individual habitat types derived from stream inventory data collected during summer and winter. It then estimates potential smolts by applying survival rates from each of these life stages to the smolt stage
The estimates of potential coho salmon smolt capacity generated by this model have been shown to be closely related to actual smolt production when summer habitat is fully seeded with juveniles (approximately 1.5-2.0 parr/m^2 of pool)
Research has found that suitable winter rearing habitat typically is in least supply in Oregon coastal streams compared with the other four types of habitat and thus limits smolt production (; Nickelson et al. 1992a, 1992b). Thus we can use the HLFM and data from inventories of winter habitat to estimate the smolt capacity of a reach of stream.

Because stream habitat typically is surveyed only during summer, most stream reaches lack data on winter habitat. Therefore, a multiple regression model was used to relate summer habitat to winter habitat and estimate smolt potential for these stream reaches. This model was developed from data for 74 stream reaches where both summer and winter habitat surveys have been conducted, and predicts smolt potential (as estimated by HLFM) from stream reach characteristics determined during summer stream habitat surveys. To account for differences in stream size, smolt potential was expressed as a density based on reach area derived from active channel width. Some variables were transformed to linearize the function or to normalize and equalize the variance. The regression model shown below explained 80% of the variation in the dependent variable (Table 2).

[1] $C = (0.4000 - 0.0682\log_e w - 0.0332g + 0.1030b + 0.2020p)^2$,

where C is the predicted potential smolt density for the reach expressed as smolts/m^2, w is the active channel width of the reach, g is the gradient of the reach, b is the number of beaver dams per km in the reach, and p is the arc sine square root transformation of the percent of pool in the reach. To test the predictive power of this regression, the regression was estimated separately for five randomly picked subsets consisting of 75% of the data and then used to predict the remaining data in each case.

The result was that smolt capacities predicted by the multiple regression model were significantly correlated with smolt capacities estimated using the HLFM ($p<0.001$; $r = 0.874$). To account for uncertainty at the upper end of this relationship, where few values occurred, maximum potential smolt density was capped at $1.15/m^2$ (the density expected if the entire reach were made up of the best quality habitat).

Maximum smolt capacity (*M*) for each reach, expressed as a total number of smolts, was calculated by multiplying C by the total area of the reach (length multiplied by active channel width). The number of adults expected to be produced by these smolts was estimated by multiplying by marine survival, which for the purpose of this model was defined as the period of downstream smolt migration from the natal stream, ocean residence, and upstream adult migration back to the natal stream.

Over-Winter Survival

Observations of over-winter survival in a several streams was positively correlated with potential smolt density (C) as estimated by HLFM. This relationship is key to the influence of habitat quality on coho salmon population dynamics. It is based on observed over-winter survival estimated for 5 streams (four of which have been studied for 7 years) and the potential smolt capacity for the streams estimated from winter inventory data using the HLFM This relationship yields the following equation:

[2] $S_{ow} = 0.1461 \log_e C + 0.5244$,

where S_{ow} is over-winter survival. The relationship explains 70% of the observed variation in over-winter survival (Table 2). Thus, *C* is not only an estimate of potential smolt density, but it is also an index of habitat quality that is related to juvenile survival. Because this equation produces survival rates ≤ 0 when $C < 0.03$ for a reach, all such reaches were assigned a survival rate of 2.5%, the lowest value observed.

Egg deposition needed to produce maximum smolts

The egg deposition needed to produce maximum smolts (D_m) is synonymous with the concept of full seeding of the habitat, and was calculated from:

[3] $D_m = M / S_{smolt}$.,

where S_{smolt} is egg-to-smolt survival rate which was calculated for each reach by multiplying over-winter survival rate by egg-to-summer parr survival rate. To estimate

D_m we assumed a constant egg-to-summer parr survival of 7% for all reaches. This value was the approximate survival rate at the point of maximum parr production (full seeding) on a Ricker stock-recruitment curve based on data for three Oregon coastal streams from Moring and Lantz (1975).

Assumptions

Implicit to the habitat quality component of the model are the assumptions that winter habitat is the primary bottleneck to smolt production in each stream reach, and that survival from egg deposition to summer parr is 7% for all reaches when at full seeding. These assumptions are necessary because we have inadequate information upon which to base a more detailed analysis that would account for all the factors that influence survival. For example, some stream reaches may experience high water temperatures that exclude coho salmon during summer but then provide rearing habitat when waters cool in the winter. Depending on their location relative to the possibility of immigration of juveniles from other areas for over-wintering, these reaches may be limited by summer habitat. If we had adequate water temperature data, these reaches could be identified and adjustments could be made to the analysis. Similarly, sedimentation, and excess scouring can reduce egg survival. If information about these factors and their impact on survival were available for each reach, egg-to-parr survival could be appropriately adjusted. In lieu of such data we are forced to make the above assumptions.

The Forward Simulation Component of the Model

The elements that comprise the forward simulation component of the model follow the life history stages of coho salmon (Figure 3). Coho salmon in Oregon coastal streams typically spawn from early November through mid-January. Juveniles emerge from the gravel in spring and typically spend a summer and winter in freshwater before migrating to the ocean in their second spring. A very small percent of juveniles (<5%) spend an additional winter in freshwater, migrating to the ocean in their third spring (Moring and Lantz 1975). Precocious males, called jacks, return to freshwater at the end of one summer in the ocean as age 2 spawners. They comprise about 20% of each run (Moring and Lantz 1975), although this is variable depending on interannual variation in marine survival, which is usually determined for a cohort during their first few weeks in the ocean (Pearcy 1992). Adult coho return to freshwater after their second summer in the ocean as age 3 spawners. Because of the predominance of age 3 adults in Oregon coho salmon populations, they are considered to have 3 brood cycles. For example, adults spawning in 1990, 1991, and 1992 will primarily contribute offspring to adults spawning in 1993, 1994, and 1995, respectively. Details of the modeling at each life stage are described below:

Spawners

Spawners were the starting point for the simulations and the ending point for each generation. For the purpose of the model spawners included only age-3 adults. For simplification, jacks were not included in the calculations. Similarly, because age-4 adults are very rare they were also excluded from the model. The absence of these two age classes from the modeled populations could possibly represent a slight underestimation of the productive potential of the modeled populations.

The model incorporated a 5% within-basin straying rate to the population. Labelle (1992) found that straying of wild adult coho salmon among Vancouver Island tributaries to the Strait of Georgia ranged from 0 to 7.8%, averaged 4.2% one year and 0% a second year, and averaged 2.1% overall. The value we used for within basin straying was roughly double Labelle's among basin rate. The straying rate was applied in the form of two components: 1) fish leaving a reach at a random rate with a binomial probability distribution having $p = 0.05$, and; 2) fish that have left a reach selecting a new reach at random with equal probability for all reaches. The effect was to redistribute 5% of the spawners each generation. Many strays were unproductive because they arrived in a reach with poor habitat or arrived alone - two fish present at the same time, including one male and one female, were required for spawning in this model.

Because wild coho in a given Oregon basin might spawn over a period of 2-3 months (Cooney and Jacobs 1995), fish spawning early cannot interact with fish spawning late. This is usually not a problem when populations are large; spawners should have little problem finding mates. However, when spawner populations are very small and some fish are present in a stream early and others late, finding a mate could become problematic. Spawners not finding mates is a depensatory effect of small spawner number. To simulate the effects of this depensation, time of spawning was split into two periods: early and late. If the number of spawners was >200, the spawners were divided evenly between the time periods. If the total number of spawners was $\leq$200, the number of spawners in the first period was generated from a binomial distribution having $p = 0.5$ and $n =$ the total number of spawners and the number of spawners in the second period was derived by subtraction. This increased the probability that spawners would not be successful because they spawned at different times, thus increasing the likelihood of not finding a mate. Not including jacks in the model, makes this portion of the model conservative (i.e. increases the likelihood that the model will project a small population)

Eggs

The number of female spawners was calculated in two ways depending on the total number of spawners. If the total number of spawners was $\geq$20 in a particular time period, the sex ratio is assumed to be 1:1. If the number of spawners was <20, the number of females was generated from a binomial distribution having $p = 0.5$ and n = the number of spawners in the time period. This adds an additional depensatory effect of small spawner number.

Egg deposition (D) was calculated as 2500 eggs per female (Moring and Lantz 1975, ODFW unpublished data for 1990-95) unless all spawners in a time period were females, in which case, egg deposition for that time period was 0 (again the model is conservative, as the inclusion of jacks would decrease the probability of this happening). Egg deposition from the two time periods was summed.

Koski (1966) estimated no fry emerge from about 15% of coho salmon redds, the likely result of gravel scouring. Thus we reduced egg deposition to account for this mortality. This was done by estimating the number of successful redds in each reach by adjusting the number of female spawners. When female spawners was >200, the number of successful females was 85% of the total. When the number of females was $\leq$200, the number of females was generated from a binomial distribution having $p = 0.85$, and n = number of females.

Summer parr

The number of summer parr was calculated by multiplying egg deposition by egg-to-parr survival rate (S_{parr}), which was estimated from a density dependent function based on the relative level of seeding (P), where:

[4] $P = D / D_m$.

Relative seeding level was used as the independent variable in this relationship because each reach had a different productive capacity. Thus, a given number of eggs would represent a different level of seeding in each reach and therefore a different point on the density dependent curve. Using the seeding level provides standardization across reaches. The relationship between seeding level and egg-to-parr survival rate(Table 2), based on data from Moring and Lantz (1975), is shown in and yields the following equation:

[5] $S_{parr} = 0.064P^{-0.743} e^{E}$,

where E is an error term derived by multiplying the standard deviation of the residuals from the relationship by a value chosen randomly from a normal distribution with mean 0 and standard deviation of 1. Because this fitted curve results in survival rates >100% when seeding level is < 2.5%, egg-to-parr survival rate was capped at 40%, just above the highest observed in the data set. The log normal form of the error term also has a tendency to produce unrealistically high survival rates all along the curve. To curb this tendency, the maximum random value chosen from the normal distribution was 1.167. This resulted in limiting the upper limit of variability to be very slightly above that actually observed in the data set providing a measure of conservatism to the model Minimum survival rates were not affected. A new random error value was calculated each generation.

Also at this point in the life history, we added a factor to account for the genetic effects of small spawner population size. When effective population size (N_e) is small, generally on the order of 100 individuals or less, genetic fitness is reduced because deleterious mutations accumulate due to random genetic drift (Lynch, in press) whereas when N_e is relatively large (1 000 individuals) reduction in fitness is generally not a problem. This reduction in fitness is in the range of 1.5% per generation at very low N_e and is cumulative (Lynch, in press). Lynch further has estimated that for salmonids, a conservative estimate of N_e is approximately 20% of the actual number of spawners. Because there is genetic interaction among successive broods of coho salmon, through mixing of age-2 jacks, age-3 adults, and age-4 adults [estimated to be about 3% for Oregon streams resulting from age 2 smolts (Moring and Lantz 1975)], N_e can be calculated as 20% of $3N_i$, where N_i is the number of spawners in a basin in generation i. We can model reduction in fitness (f) as a reduction in survival, and describe the portion attributable to any given generation by assuming: 1) $f = 0$ when $N_e \geq 1\ 000$; 2) $f = 0.001$ when $N_e = 100$; 3) $f = 0.015$ when $N_e = 5$, and; 4) the change in f is linear between $N_e = 5$ and $N_e = 100$ and between $N_e = 100$ and $N_e = 1\ 000$. Thus for any given generation i the reduction in fitness attributable to the spawner population size that year is:

[6] $f_i = 0$ when $3N_i \geq 5\ 000$,

[7] $f_i = 1.11 * 10^{-3} - 2.22 * 10^{-7}(3Ni)$ when $500 \leq 3N_i < 5\ 000$,

[8] $f_i = 1.57 * 10^{-2} - 2.95 * 10^{-5}(3Ni)$ when $25 < 3N_i < 500$, and

[9] $f_i = 0.015$ when $3N_i \leq 25$.

The cumulative effect through time of deleterious mutations (g) can then be expressed as:

[10] $g_i = (1 - f_1)(1 - f_2)(1 - f_3)(1 - f_i)$

and in the model was multiplied by the egg-to-parr survival rate to effect a reduction in survival. As long as N_e remained at least 1 000, the value of g was 1.0. Maximum reduction in reproductive success occurred if all generations were below $3N \leq 25$ (Equation 9). In this case $g_i = (1\text{-}0.015)^n$ where n = the number of generations. For n = 10 the minimum $g_i = 0.859$. For n = 33 the minimum $g_i = 0.607$. These extreme values were rarely realized in the simulations.

Smolts

The number of smolts was calculated by multiplying summer parr by over-winter survival rate. The value for over-winter survival rate for each reach was derived by adding an error term to the value of S_{ow}. (Equation 2) The error term for a given generation was calculated as the standard deviation of the observed residuals from Equation 2 multiplied by a value chosen randomly from a normal distribution with mean 0 and standard deviation of 1 This error term also has a tendency to produce unrealistically high survival rates. To curb this tendency, the maximum random value chosen from the normal distribution was 1.117. This confined the variability in maximum survival rates to the range of those observed in the data and added further conservatism to the model Low survival values were not curbed, except that, any values ≤ 0 were set at 2.5%, the lowest value observed.

Adults

The number of adults in the next generation was calculated by multiplying the number of smolts by a marine survival rate. Unfortunately there are no direct measures of marine survival available for wild coho salmon from Oregon. However, Nickelson (1986) using an indirect approach, estimated that survival rates for hatchery and wild coho salmon in Oregon were similar during periods of favorable ocean conditions, but that wild smolts survived at roughly twice the rate of hatchery smolts during periods of unfavorable ocean conditions. Data from Washington (Seiler 1989) and British Columbia (Cross et al. 1991) also suggest that marine survival of wild smolts is about double that of hatchery smolts during a period of unfavorable ocean conditions. Marine survival of coho salmon smolts from Oregon coastal hatcheries north of Cape Blanco have averaged 1.5% for brood years 1982-91 (Lewis 1995). Assuming the above, this would represent 3% survival of wild smolts during this period.

Because separate simulations were run over two different time intervals (10 generations and 33 generations), marine survival was treated in two ways. For simulations of 10 generation duration, the marine survival rate for a given generation was the average rate set at initialization of the simulation (1.5%, 3%, or 5%) plus an error term. The error term was derived by multiplying the standard deviation of the average survival rate (approximated as the square root of the average survival rate) by a randomly chosen standard normal deviate from the mean of marine survival for hatchery coho salmon for brood years 1958-1992. The resulting distribution of errors was approximately log-normal. Minimum marine survival allowed in the model was 0.4% depicts an example of the distribution of marine survivals used by the model. This approach was used because 10 generations was about as long a period as we might expect between climatic regime shifts within which we might expect some average survival with reasonable variation. For example regime shifts occurred in the mid-1920s, mid-1940, and 1977, periods of 20 to 30 years (Francis and Mantua, In Press).

For the long-term simulations, it was necessary to take into account the cyclic nature of climate (*i.e.* the regime shifts) and the marine environment (Beamish and Bouillon 1993; Hsieh et al. 1995). To accomplish this, we used the Aleutian Low Pressure Index (ALPI) (Beamish and Bouillon 1993) as a template for the pattern of long-term climatic variability. This annual index represents the intensity of the low pressure system over the northern North Pacific Ocean during winter and spring (December - May) for the years 1900-1989. Beamish and Bouillon (1993) noted a strong positive correlation between ALPI and salmon production in the Gulf of Alaska and, typically, production of coho salmon in Alaska and Oregon have been inversely correlated (Nickelson and Lichatowich 1984). Thus, when ALPI is low, survival of coho salmon in Oregon has been generally high, and when ALPI is high, survival has been generally low. For modeling purposes, the long term cyclic pattern of ALPI was approximated by a step function developed by dividing the smoothed trend (9y running average) by a constant, and converting to an integer Average marine survival rates of 10%, 7.75%, 5.5%, 3.25%, and 1% were assigned to the resulting steps of 0 through 4, respectively. Since the database runs for only 89 years, it was doubled by appending the first year to the last year.

Because we are currently experiencing low survival conditions, simulations began with a randomly chosen year *j* having a step value of 3 or 4. For each subsequent generation of the simulation, the model proceeded through the ALPI cycle using the value of year *j*+3, *j*+6...*j*+99 (because of the 3y cycle of coho salmon) using the average survival rate each year that was assigned to the current step. A stochastic error term was then added in as was done for the 10 generation simulations.

Spawners

The number of spawners in a reach in the subsequent generation was calculated by multiplying the number of smolts times marine survival times 1 minus the fishery exploitation rate. Fishery exploitation rates were either 1) held constant for 10 generations or 2) varied with marine survival for 33 generations (See Simulations). The number of spawners in a basin was calculated by summing across reaches.

Depicting Habitat Quality

One product of the habitat quality component of the model is the depiction of relative habitat quality and the ability to compare habitat quality among reaches, streams, and basins. Two parameters are useful descriptors of habitat quality: 1) smolts produced per adult spawner when maximum smolt production is achieved, and; 2) the proportion of the habitat within a basin where the population would, on average, replace itself if marine survival were some given rate.

To calculate smolts per adult we first must calculate the number of adults needed to produce the maximum number of smolts (A_m). Two assumptions are necessary: 1) fecundity is assumed to be 2 500 eggs per female (Moring and Lantz 1975), and; 2) sex ratio is assumed to be 1:1. The value is then derived from:

[7] $A_m = (D_m / 2\,500) * 2$. and smolts per adult equals M / A_m..

The proportion of the habitat within a basin where the population would replace itself if marine survival were some particular value, is derived by summing the length of reaches that meet the following criteria:

[8] $M * S_{mar} > A_m$

where S_{mar} is marine survival rate and M is maximum smolt capacity (See Estimates of Smolt Production Capacity), and then dividing by the total length of the basin sampled. We defined good quality habitat as those reaches that could sustain spawning populations at 3% marine survival. Lower quality reaches required higher marine survival rates to sustain spawning populations.

Forward Simulations

Monte Carlo trials of 1 000 iterations were conducted for individual river basins, recording the coho salmon population size each generation for 10 generations or 33 generations for each iteration. The median population, probability of population decline, and probability of extinction for a single population cycle were calculated from the results from each trial. Because of uncertainty at low population sizes, extinction was defined to occur in a given iteration if a population size $\leq$ 50 occurred at any time during the 10 or 33 generations modeled, regardless of final population size. In addition, from the 33 generation runs the minimum population and the minimum number of stream reaches populated were recorded for each iteration. Three coastal basins were chosen for these trials The basins represented high (Yaquina Basin), medium (Coos Bay Basin), and low (Tillamook Bay Basin) levels of habitat quality based on the results of the habitat component of the model.

The Tillamook Bay basin (Tillamook basin), located at 45° 30' N latitude, is comprised of 5 major rivers and 249 miles of coho salmon habitat primarily in second to fifth streams. The basin covers about 10 600 km^2, much of which burned in the late 1930s and 1940s. The Yaquina basin, located at 44° 36' N latitude, is a small basin (about 4 600 km^2) and has 109 miles of coho salmon habitat. The Coos Bay basin (Coos basin), located at 43° 24' N latitude, covers about 11 300 km^2 and contains 208 miles of coho salmon habitat. All three basins have large estuaries and the watersheds have been logged extensively since the turn of the century.

Each basin was defined from the set of reaches surveyed for habitat quality and represented 36%, 57%, and 25% of the coho salmon habitat in the Tillamook, Yaquina, and Coos basins, respectively. For each reach, three reach level parameters were provided from the habitat component of the model: 1) maximum smolt capacity (M); 2) average over-winter survival rate at maximum smolt capacity (S_{ow}), and; 3) egg deposition needed to produce maximum smolts (D_m). In addition, a starting spawner population number was specified for each reach.

The distribution of the starting population across reaches was dependent upon the quality of habitat in each reach because the capacity of a given reach to support coho salmon varied with habitat quality. This distribution was determined by using a spreadsheet form of the model with the stochasticity removed. An iterative solver function was used to solve for the marine survival that would result in the desired final population after 30 generations (a period long enough for an equilibrium population size to be established in each reach). This method produced distributions of spawners based on 1995 population levels that were not significantly different (Wilcoxon Signed Rank Test; $p > 0.5$) from the distribution of actual counts based on spawning surveys (ODFW unpublished data) conducted in the three basins

Reaches surveyed for habitat quality represented 36%, 57%, and 25% of available coho salmon habitat in the Tillamook, Yaquina, and Coos basins, respectively. To simulate effects of low spawner densities and straying we needed a representation of all reaches in each basin. We assumed that the distribution of habitat qualities in the sampled reaches represented all reaches in that basin. The total number of reaches present in each basin was calculated from the sampling fraction, and reaches were chosen from the sample randomly, with replacement, up to the total number of reaches. The reach population was bootstrapped for each iteration of the model (Efron and Tibshirani 1986; Efron 1987). As a result, uncertainty arising from sampling variability in the habitat data was incorporated in the range of modeled results.

10 Generation Trials

The 10 generation trials were used to examine the effects of marine survival and harvest rate on the probability of persistence of coastal Oregon coho salmon in each basin. Three levels of average marine survival (1.5%, 3%, and 5%) were used as input parameters. Although a set survival rate was used as an input parameter, the stochasticity built into the model caused marine survival to vary around the average input value each generation as previously described.

To examine the effects of harvest on the probability of persistence of coastal Oregon coho salmon in each basin, exploitation rate was varied as an input parameter. Exploitation rates used were 0%, 10%, 20%, 30%, and 40%. This range was used to describe the relationship between harvest rate and measures of persistence at each of the marine survival levels. Initial populations for these trials were set at 1 000 spawners.

33 Generation Trials

The 33 generation trials were used to examine the long-term risk of extinction of Oregon coastal coho salmon populations. As discussed above, marine survival followed a cyclic pattern in these trials. Harvest rates were coupled with marine survival to approximate the harvest strategy proposed for coho salmon in the Oregon Coastal Salmonid Restoration Initiative (State of Oregon 1996). For marine survivals of 1%, 3.25%, 5.5%, 7.75%, and 10% exploitation rates were 10%, 15%, 20%, 30%, and 35%, respectively.

To examine the effect of initial population size of coho salmon in a basin on the probability of extinction, the initial population size was varied. Starting populations of approximately 50, 100, 200, 300, 400, 600, 1 000, and 1 500 were modeled for each of the three basins. In addition, the estimated population in each basin in 1995 (ODFW unpublished data) was used as a starting point. These populations were 275 for the Tillamook Basin, 5 671 for the Yaquina Basin, and 10 400 for the Coos basin.

The trials described so far are based on current habitat remaining constant for the next century. It is unrealistic to expect this to be the case. However, it is also uncertain what the trajectory of habitat change over the next century will be. Habitat change was modeled as an exponential function that resulted in the specified change (ΔH) in habitat quality (H) over the time period of the run. Trials were run for changes in *H* of +10%, -10%, -20%, -30%, -40% and -60% over the next century using the 1995 estimated populations as the initial population for each basin. Each generation, the habitat quality (smolts/m^2) in each reach was increased or decreased by multiplying potential smolt density (*C*) by $e^{(a)}$ where a = ln(ΔH/(# of generations-1)) .

RESULTS AND DISCUSSION

Quality of Habitat in Oregon Coastal Streams

The analysis indicates that the majority of coho salmon habitat in most coastal basins is poor quality. Coast wide, about 20% of the coho salmon habitat is of sufficient quality that spawners would at least replace themselves if marine survival was 3% and exploitation rate was 0. However, in the Oregon coastal basins between the Columbia River and Cape Blanco this equates to about 800 miles of habitat where coho salmon should sustain themselves when marine survival is poor, as it has been for the past decade. The proportion of this quality habitat varies by basin ranging from 3.5% in the Rogue River basin (which is south of Cape Blanco) to 42.5% in the Yaquina River basin. These estimates of relative habitat quality appear to be realistic.

We found that, with the exception of the Coos and Coquille River basins, there was a very good correlation (R = 0.92) between estimated habitat quality for a basin, and the 1990-95 mean coho salmon spawners per mile for the basin (ODFW unpublished data; extremes removed)( ). The Coos and Coquille basins are the two most southerly basins where spawner survey data are available. These basins have experienced much higher spawner numbers in recent years than the northern basins, most likely the result of lower exploitation rates and better marine survival conditions (ODFW 1995).

Of particular interest is the question of how the quality of habitat has changed over the past century. It has been estimated that under natural disturbance regimes in Oregon coastal basins (i.e. before anthropogenic influence) about 60% of watersheds were productive for anadromous salmonids at any point in time (Benda 1994; Reeves et al. 1995). Reeves et al. (1995) describe a cyclic pattern of change that streams undergo over periods of about 300 years. In this analysis, productive was defined as habitat of a quality similar to Franklin Creek, a stream in the Umpqua Basin that they studied (Gordon Reeves, USDA Forest Service, Corvallis, OR, personal communication). The habitat data that we have for Franklin Creek predicts that coho salmon should at least replace themselves when marine survival is 4%. We have estimated that about 38% of the current coho salmon habitat in Oregon coastal basins north of Cape Blanco meets this definition of productive. If we assume that at the beginning of this century 60% of the habitat was productive, the quality of the current habitat represents a 37% decline over a period of approximately 100 years. It should be noted that this only applies to habitat that today is considered to be coho salmon habitat and does not include the total loss of habitat along the lower mainstems of many coastal rivers such as the coniferous marshes of the Coquille River (Benner 1992). Beechie et al. (1995) estimated that the productive potential of winter habitat in tributaries to the Skagit River, Washington had declined by 23% from historical levels, whereas the productive potential of habitats associated with the mainstem (including sloughs and side channels) had declined by 40%.

Forward Simulation Model Behavior

Quantitative results from this model depend on our estimates of a variety of parameters and processes. These include habitat carrying capacity, survival rates at various life-history stages, the shapes of density dependent survival functions, straying rates, and the structure of variability in egg-to-parr, over-winter, and marine survival. Inaccuracies in our estimates of these factors affect the numerical predictions of the model. However, all of these parameters are based on data from studies of coho salmon. During the course of model development, outputs were compared with known values and our understanding of the behavior of these systems, so that we are confident that the numerical outputs are in the correct range.

For example, smolt production values generated by the HLFM generally fall within the range actually observed in field studies (Skeesick 1970; Moring and Lantz 1975; Kadowaki et al. 1995) and distributions of spawners produced by the model were similar to those actually observed (Figure 7). More importantly, the relative distribution of change in population size from one generation to the next in the simulation results was not significantly different (Wilcoxon sign rank test; $p>0.4$) from that actually observed in wild coho salmon populations in Oregon coastal basins over the period of 1990-95 (Figure 10). If anything, the model tended to produce a greater percentage of declining populations than actually observed, another indication of the conservative nature of the model.

The ten generation simulations are useful to test the sensitivity of the modeled populations to a range of input conditions. From these simulations the effects of marine survival rate, exploitation rate, and differences in habitat quality on starting populations of 1 000 spawners in each basin can be observed.

The pattern of effects of marine survival and exploitation rate were similar for all three basins, differing only in magnitude (Figures 11-13). Changes in median population per mile after 10 generations, probability of population decline, and probability of extinction were all much greater when marine survival changed than when exploitation rate changed. Effects of decreased marine survival or increased exploitation rate were greatest in the Tillamook basin, where habitat quality is poorest, least in the Yaquina basin, where habitat quality is best, and intermediate in the Coos basin, where habitat quality is intermediate (See Figure 8). Only the habitats with high productivity remained viable when marine survival was low. Therefore, distribution and abundance of fish within a basin was a function of marine survival and the pattern of habitat quality. Within a reach, populations were resilient unless numbers dropped to a level where demographic risk factors became more important than density dependent population dynamics. Persistence of populations in a basin under conditions of poor marine survival depended on the highest quality reaches.

Sustainability of Oregon Coastal Coho Salmon

The 33 generation simulations are useful to examine the sustainability of Oregon coastal coho salmon. We examined beginning populations that ranged from 50 to 1 500 spawners in each of the three basins. Figure 14 presents the results of these simulations. In each basin, starting populations of 150 or more resulted in similar ending populations after 33 generations. Also in each basin, the risk of extinction ($\leq$ 50 spawners at any time) increased for starting populations less than 300-400. At starting populations of 50 and 100, probability of extinction was inversely related to habitat quality. Probability of extinction was greater in the Yaquina Basin than in either the Coos Basin or the Tillamook Basin because the small starting populations were spread thinly across greater numbers of reaches of good quality habitat. Thus, depensatory effects of small population size resulted in a greater occurrence of extinction in individual reaches in the Yaquina Basin. Median population after 33 generations in the Yaquina basin was 0 when the starting population was 50.

The above results assume that current habitat quality would be maintained for the next 100 years. We also examined the effects of changes in habitat quality ranging from a 10% increase to a 60% decrease over the next century on the median ending population and probability of extinction based on a starting population equivalent to the 1995 level in each basin (Figure 15). Based on these analyses, the model predicts that there would be a substantial increase in the risk of extinction in basins with poor quality habitat, such as the Tillamook if habitat quality over the next century declines by 30-60%. Based on our evaluation of habitat quality (See Figure 8), this would probably apply to the Nestucca, Coquille, and Rogue basins as well. Similar declines in the quality of habitat in the remaining major coastal basins would have a much lesser effect on the sustainability of coho salmon populations in those basins. However, decreased habitat quality would result in substantial decreases in population size.

Implications

Based on results of the model, the population in most major coastal Oregon basins 100 years in the future will be independent of the current population size. Exceptions may be basins such as the Tillamook, where populations have dropped below a few hundred fish in some years. Trends in marine survival and habitat quality are much more influential. Future population abundance will be heavily influenced by marine survival and by exploitation rate when marine survival is low. Results from the model indicate that populations of Oregon coastal coho salmon have not lost their resiliency. This is consistent with the observed patterns of change in abundance (Figure 10), with some populations increasing by factors of 4 to 9 in a single generation. On the other hand, populations in basins with poor habitat may lose resiliency in the future if habitat quality continues to decline at the same rate as it has for the last century.

Where Do We Go From Here?

The model described in this manuscript is a work in progress. We continue to respond to reviews of the model and make appropriate refinements. Our next step is to include the following elements in the model.

- Split spawning into 3 time periods instead of the current 2.
- Use a binomial distribution for sex ratio and spawner timing across all spawner abundance levels, not just < 20.
- Put a limit on the maximum number of females that a male can spawn with, possibly at 4:1. - Need to research this.
- Consider adding within year variability to egg-parr and overwinter survival in addition to the between year variability already modeled. This may increase

execution time substantially, and we have no data on the magnitude of this variability.

- Add a provision for reduced fecundity when marine survival is very low. This would simulate El Niño conditions that result in small fish and reduced fecundity.
- Add a binomial demographic stochasticity factor to marine survival.

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Table 1. Example of application of the coho salmon limiting factors model (HLFM Version 5.0).

Stream: East Fork Lobster Creek
Stream inventories conducted in summer 1990 and winter 1990-91
Stream Length 3.8 km

Season	Seasonal capacity	Life stage	Potential Smolts (Capacity*Survival)
Spawning	1 330 000	eggs	266 000
Spring	32 400	fry	9 800
Summer	13 800	parr	6 900
Winter	4 500	presmolts	4 100 Limiting habitat and Smolt capacity

	Stream area (m^2) by habitat from inventories		Seasonsl capacity by habitat (Area*Density)			
Habitat type	Summer	Winter	Spawning	Spring	Summer	Winter
Cascades	39	296		-	0	-
Rapids	4 398	10 307		6 200	600	100
Riffles	1 847	6 223		7 500	200	100
Glides	2 966	1 911		3 500	2 300	200
Trench pools	62	-		-	100	-
Plunge pools	667	1 167		1 000	1 000	300
Lateral scour pools	4 436	5 526		7 100	7 600	1 900
Mid-channel scour pools	-	-		-	-	-
Dammed pools	168	1 048		2 700	300	600
Alcoves	-	-		-	-	-
Beaver ponds	671	558		1 400	1 200	1 000
Backwater pools	442	529		3 000	500	300
Spawning Gravel		1 596	1 330 000			
		Total Calacity	1 330 000	32 400	13 800	4 500

Habitat type	Spring	Summer	Winter
Cascades	0.0	0.2	0.0
Rapids	0.6	.01	0.01
Riffles	1.2	.01	0.01
Glides	1.8	.08	0.1
Trench pools	1.0	1.8	0.2
Plunge pools	0.8	1.5	0.3
Lateral scour pools	1.3	1.7	0.4
Mid-channel scour pools	1.3	1.7	0.4
Dammed pools	2.6	1.8	0.6
Alcoves	2.8	0.9	1.8
Beaver ponds	2.6	1.8	1.8
Backwater pools	5.8	1.2	0.6
Spawning Gravel	2 500 eggs/redd / $3m^2$/redd = 833 eggs/m^2		

Density independent survival rates	
Egg to smolt	0.2
Spring fry to smolt	0.3
Summer parr to smolt	0.5
Winter presmolt to smolt	0.9

Table 2 ANOVA tables for regressions used in the model.

Multiple regression to predict habitat smolt capacity

	df	SS	MS	F	p
Regression	4	1.421	0.355	75.124	<0.001
Residual	69	0.346	0.005		
Total	73	1.747	0.024		

Regression of overwinter survival on smolt capacity (Equation 2 and Figure 2)

	df	SS	MS	F	p
Regression	1	0.244	0.244	57.030	<0.001
Residual	24	0.103	0.004		
Total	25	0.347	0.014		

Regression of egg-to-parr survival rate on percent ot full seeding (Equation 5 and Figure 4)

	df	SS	MS	F	p
Regression	1	9.984	9.894	52.606	<0.001
Residual	25	4.702	0.188		
Total	26	14.595	0.561		

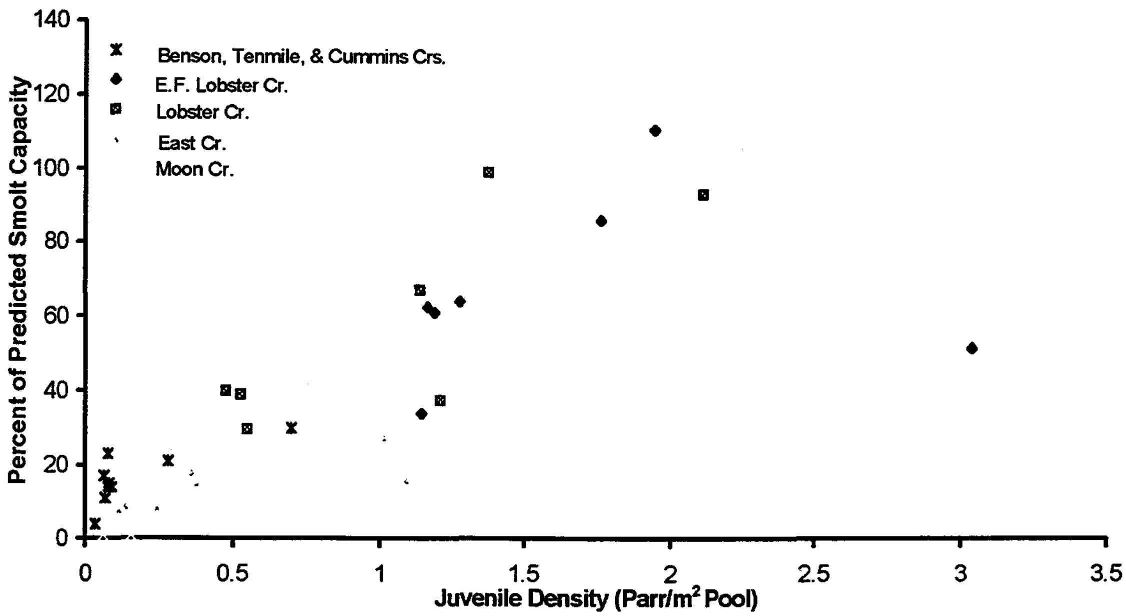


Figure 1. Performance of the coho salmon habitat limiting factors model (HLFM Version 5.0) in 7 study streams in terms of the relationship between the percent of the smolt capacity predicted by HLFM that was actually observed, and the density of juveniles present the previous summer.

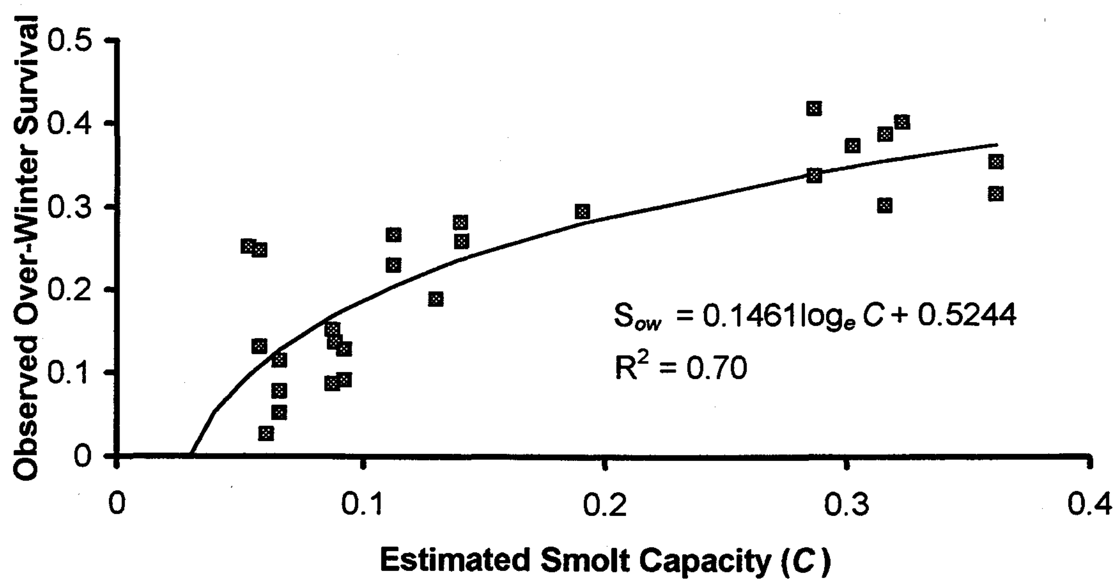


Figure 2. Relationship between observed over-winter survival of coho salmon and potential smolt capacity as estimated by the HLFM for 5 study streams.

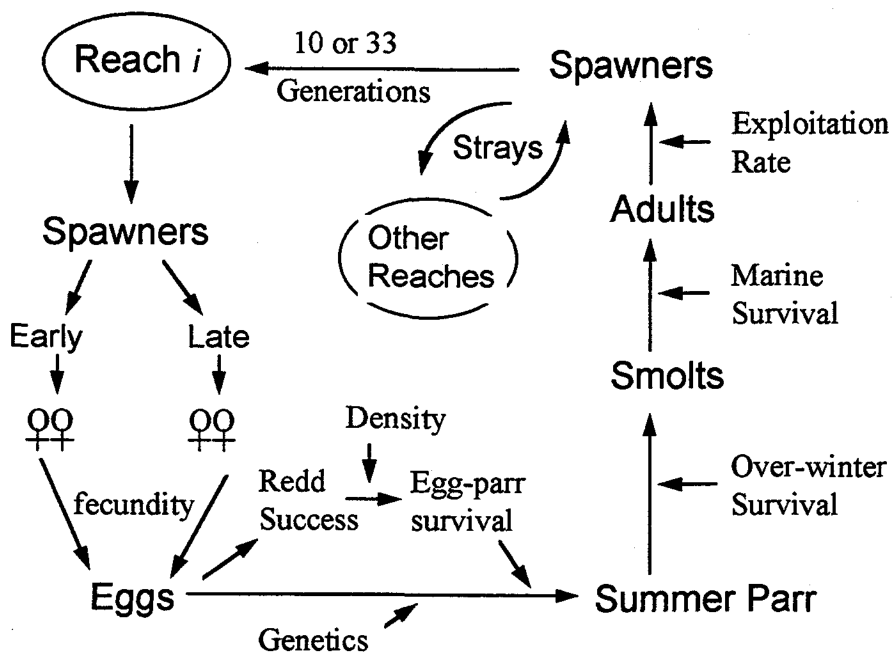


Figure 3. Flowchart showing the elements of the forward simulation component of the model.

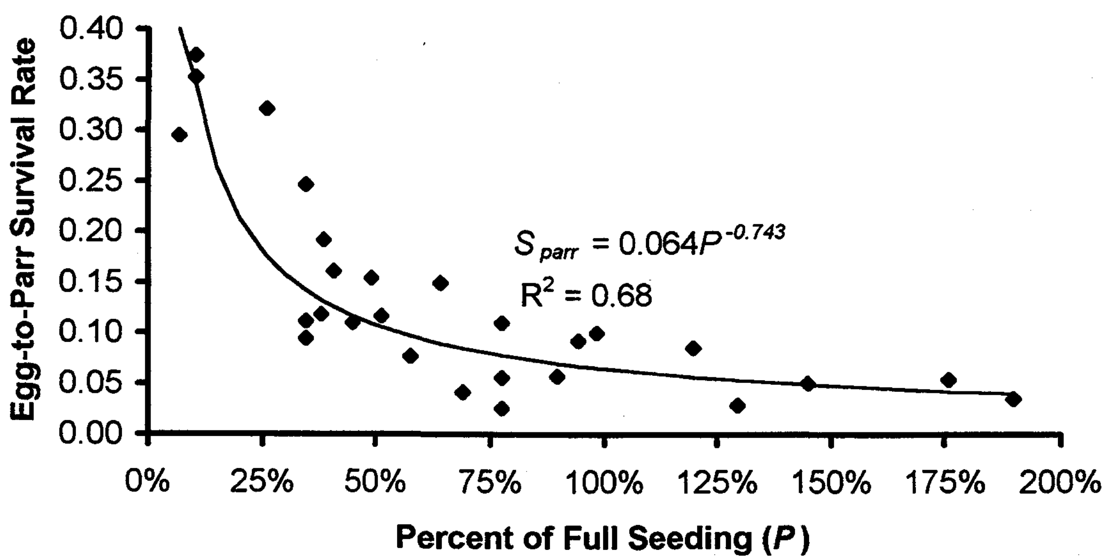


Figure 4. The relationship between egg-to-parr survival rate and percent of full seeding that is the basis for the egg-to-parr survival parameter in the model.

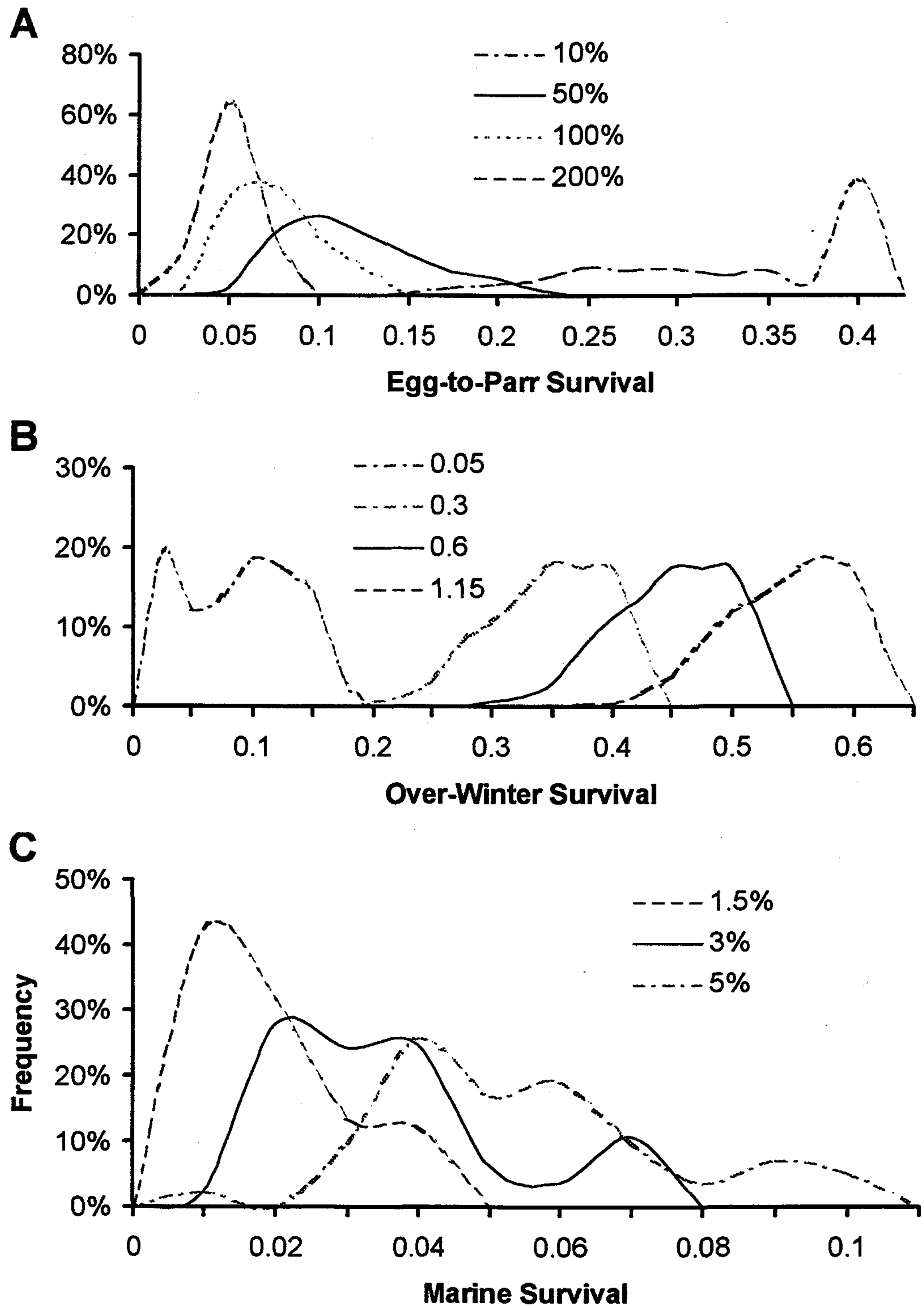


Figure 5. Examples of frequency distributions of survival rates used in the simulation model: (A) egg-to-parr survival at four proportions of full seeding, (B) over-winter survival at four levels of habitat quality expressed as smolts/m^2, and (C) marine survival rate when three average levels are used at initiation of the simulation.

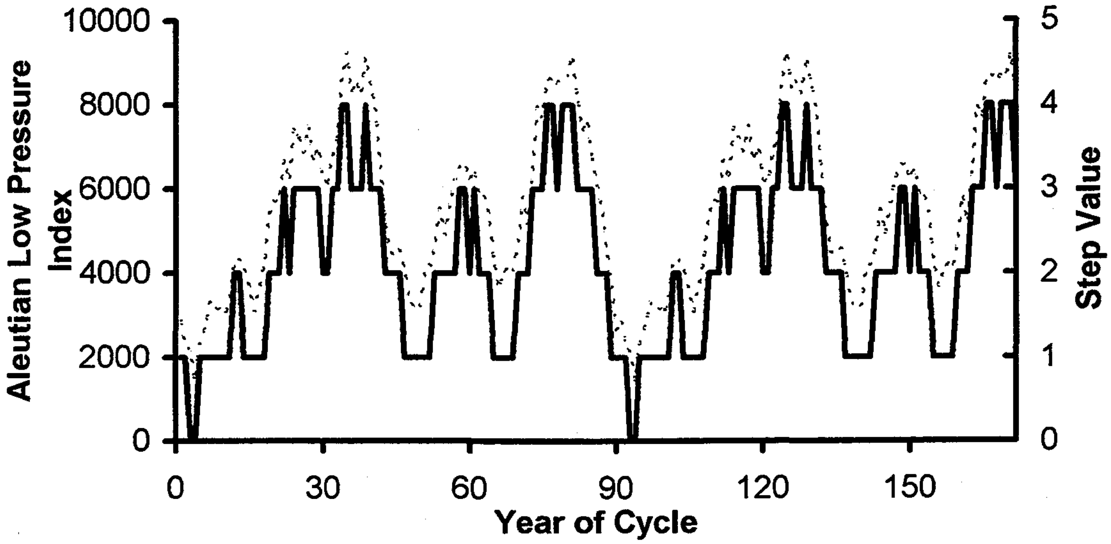


Figure. 6. The pattern of the Aleutian low pressure index (dashed line) and the corresponding step value (solid line) used in the simulation model to mimic climatic variability and determine average marine survival rate and annual exploitation rate.

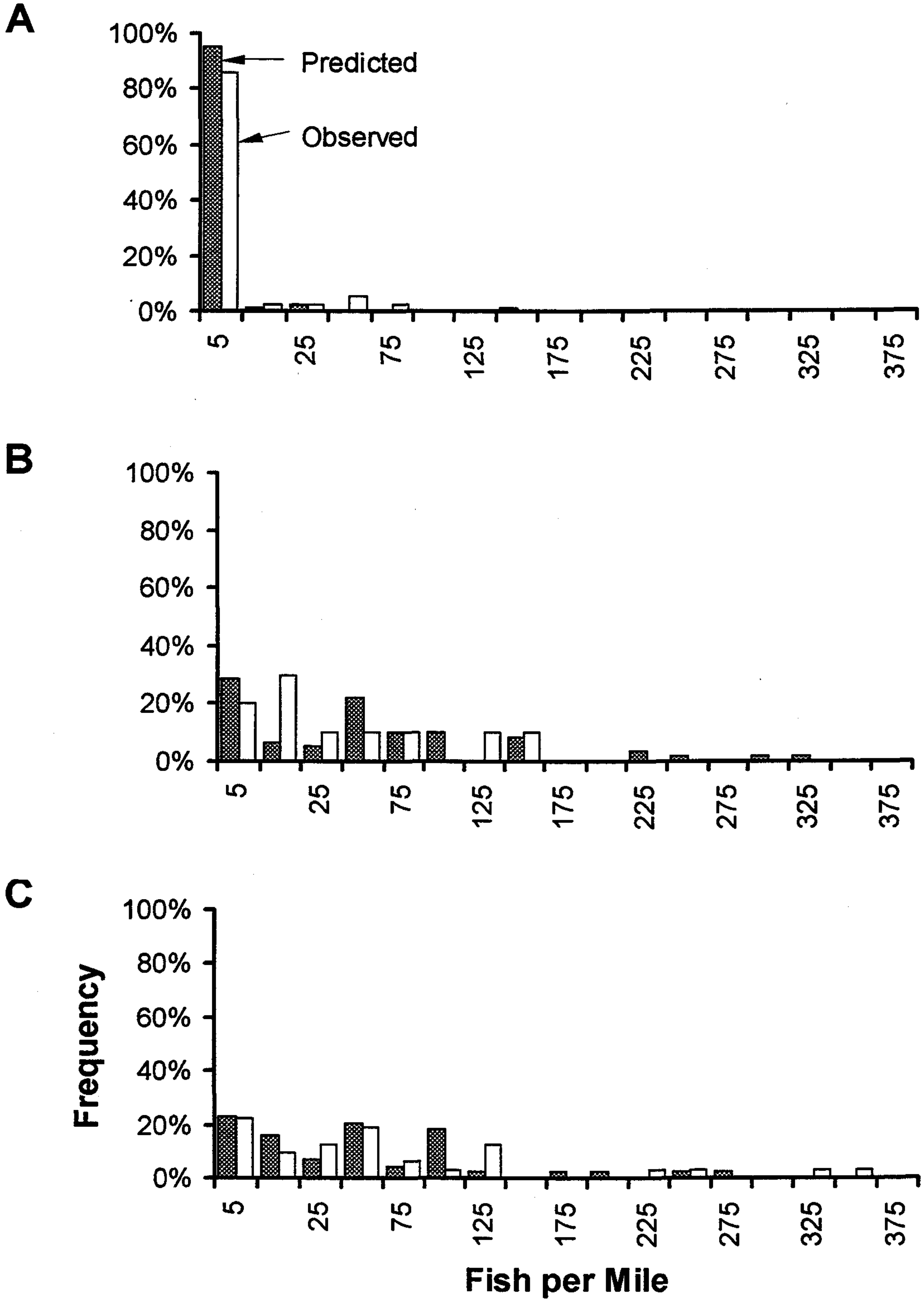


Figure 7. Predicted and observed distributions of spawners into classes of fish per mile in the 1995 run in the (A) Tillamook, (B) Yaqauina, and (C) Coos basins.

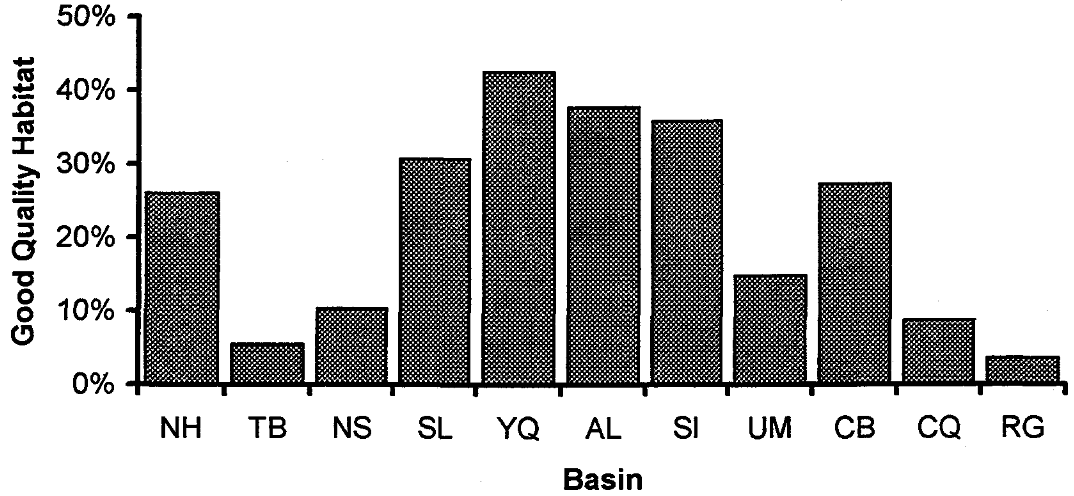


Figure 8. The proportion of coho salmon habitat Oregon coastal basins where coho salmon spawners will, at least, replace themselves if marine survival was 3% and exploitation rate was 0. NH = Nehalem; TB = Tillamook Bay; NS = Nestucca; SL = Siletz; YQ = Yaquina; AL = Alsea; SI = Siuslaw; UM = Umpqua; CB = Coos Bay; CQ = Coquille; RG = Rogue.

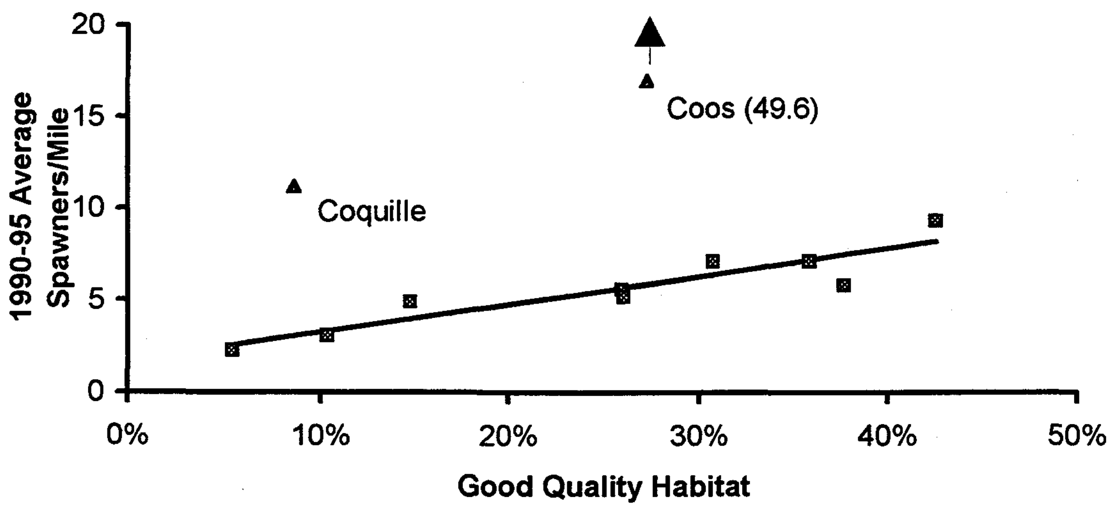


Figure 9. Relationship between 1990-95 mean coho spawners per mile (extremes removed) in 11 coastal Oregon basins and habitat quality expressed as the proportion of coho salmon habitat in each basin where coho salmon spawners will, at least, replace themselves if marine survival was 3% and exploitation rate was 0.

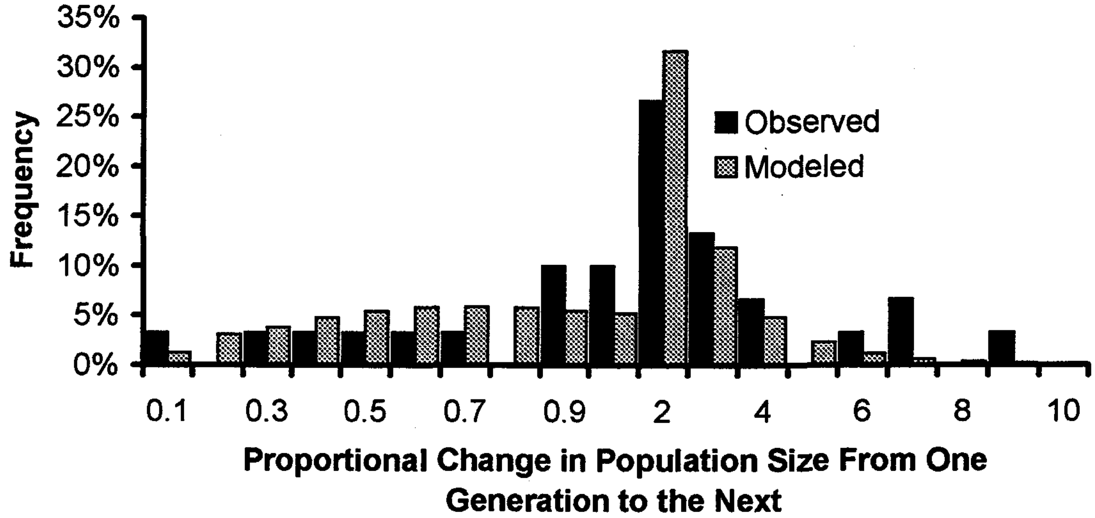


Figure 10. Frequency distribution of proportional change in population size from one generation to the next based on results from the simulation model (3 basins; 99 000 observations) and on observed spawner abundance in 11 coastal Oregon basins between 1990 and 1995.

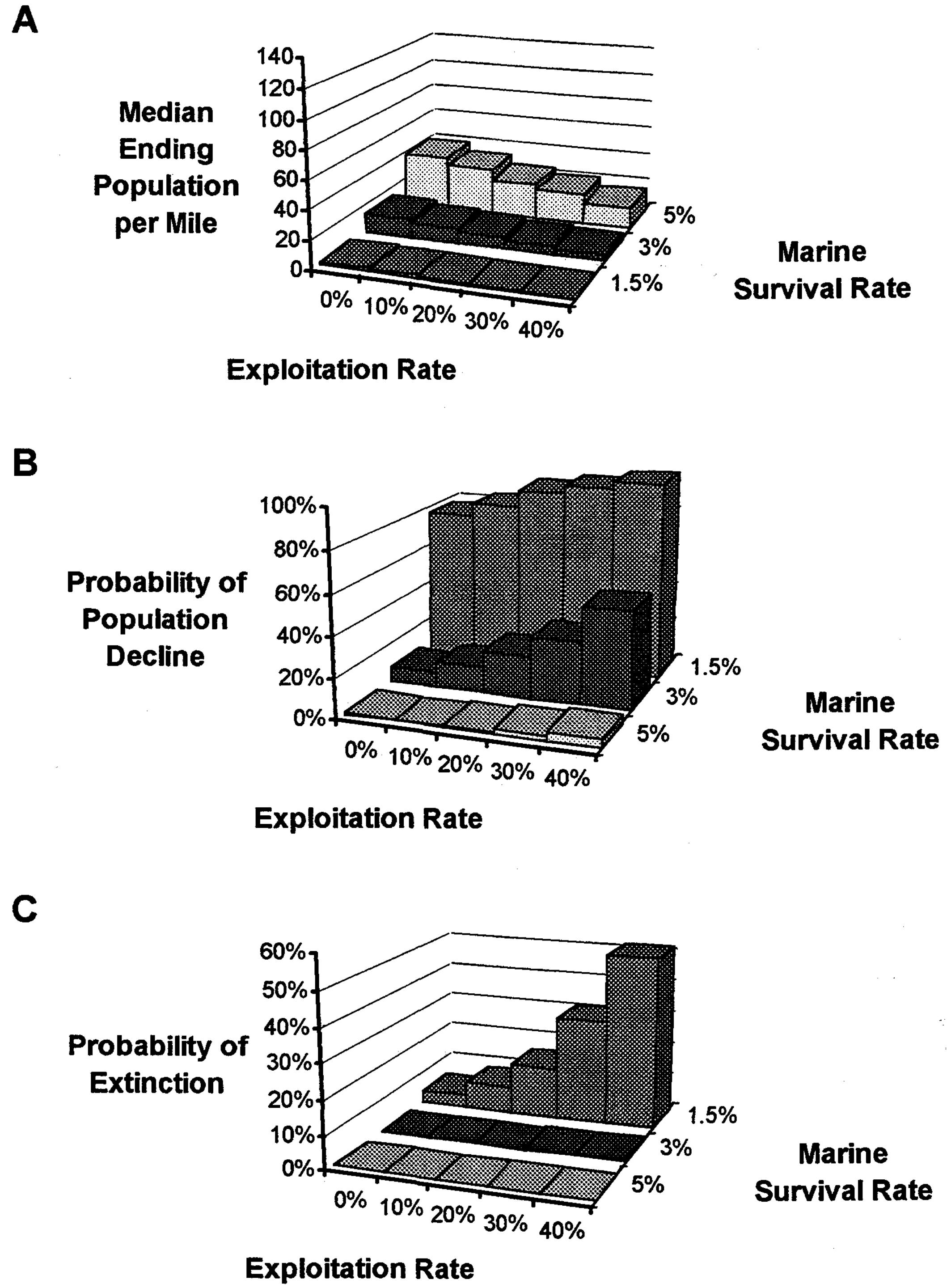
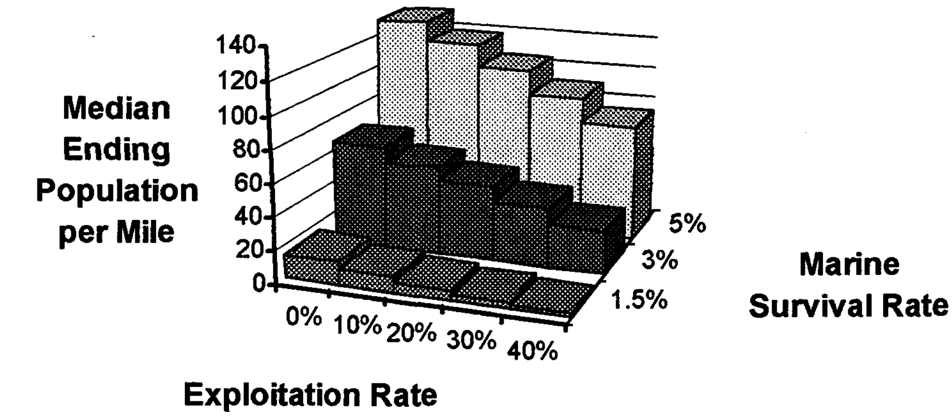
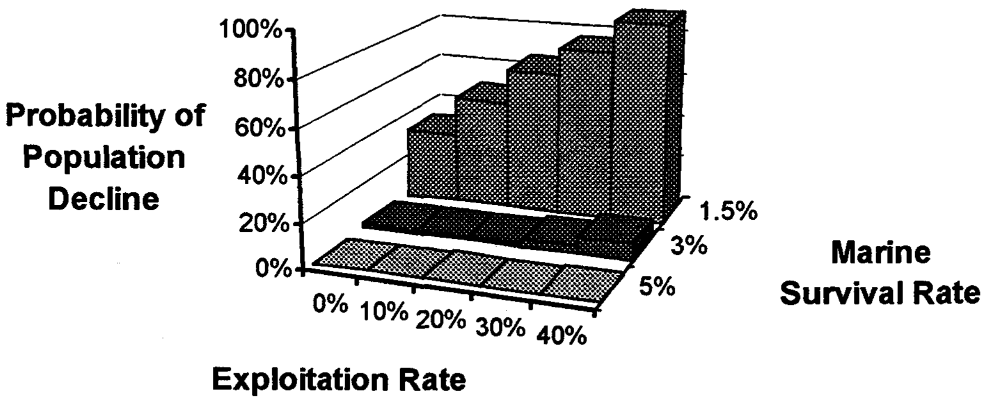


Figure 11. Results of 10 generation model simulations for the Tillamook Basin comparing different levels of marine survival and exploitation rate: (A) median ending population per mile of habitat; (B) probability of population decline over the 10 generations, and; (C) probability of extinction.

A



B



C

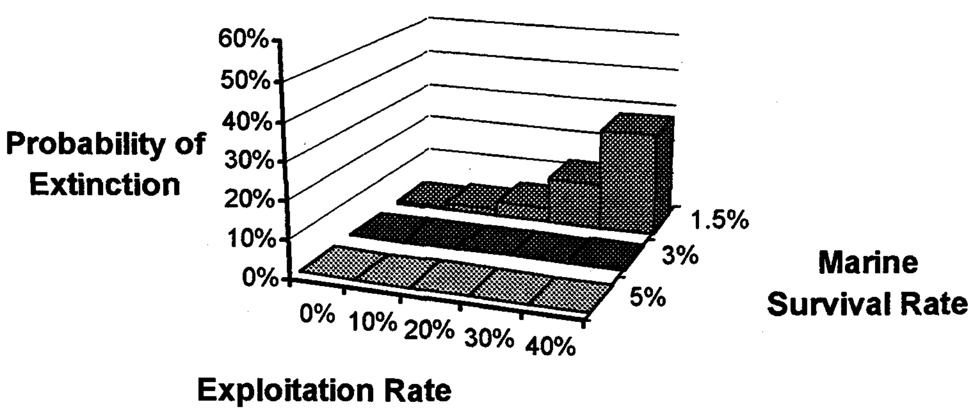


Figure 12. Results of 10 generation model simulations for the Yaquina Basin comparing different levels of marine survival and exploitation rate: (A) median ending population per mile of habitat; (B) probability of population decline over the 10 generations, and; (C) probability of extinction.

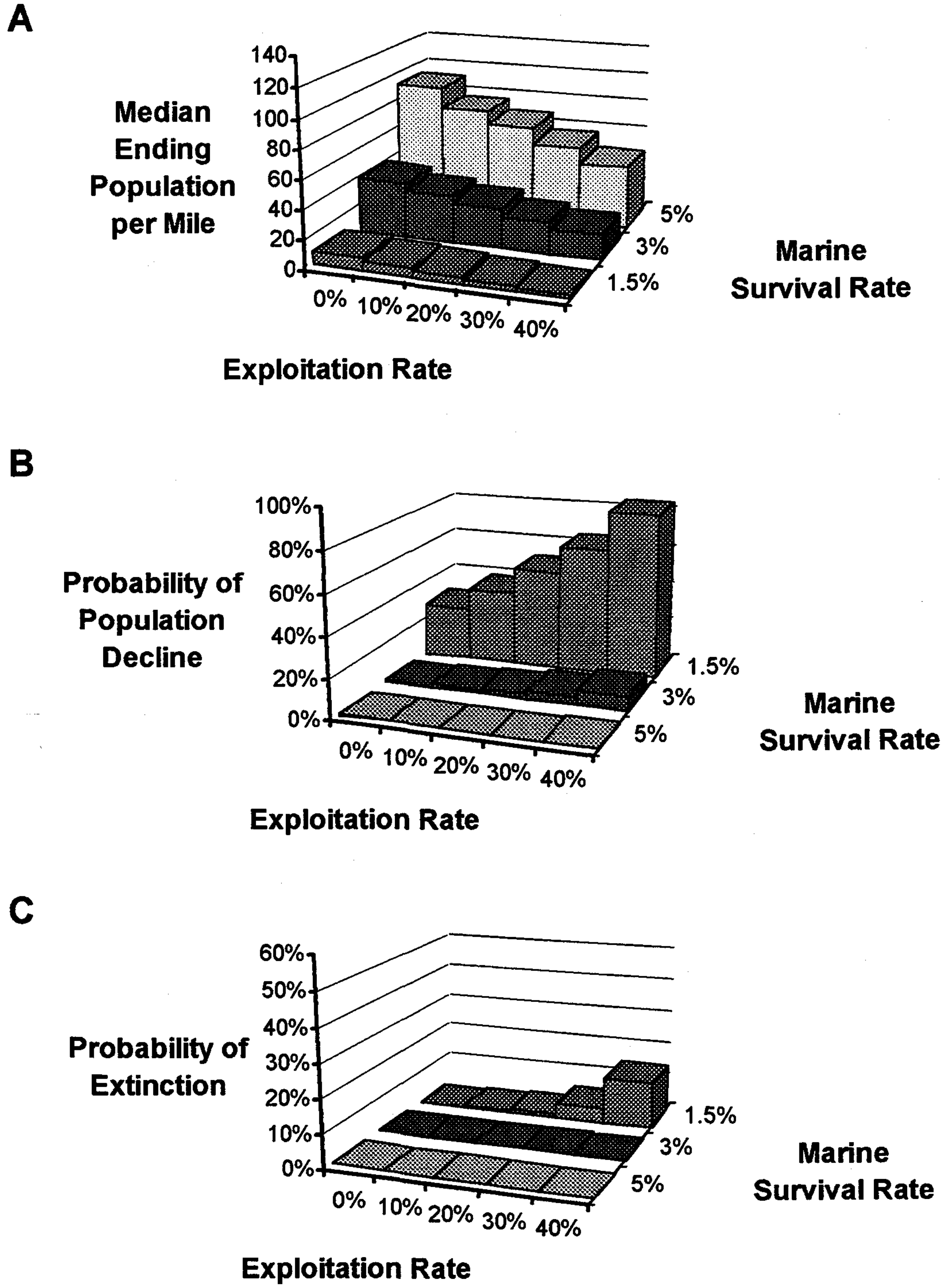


Figure 13. Results of 10 generation model simulations for the Coos Basin comparing different levels of marine survival and exploitation rate: (A) median ending population per mile of habitat; (B) probability of population decline over the 10 generations, and; (C) probability of extinction.

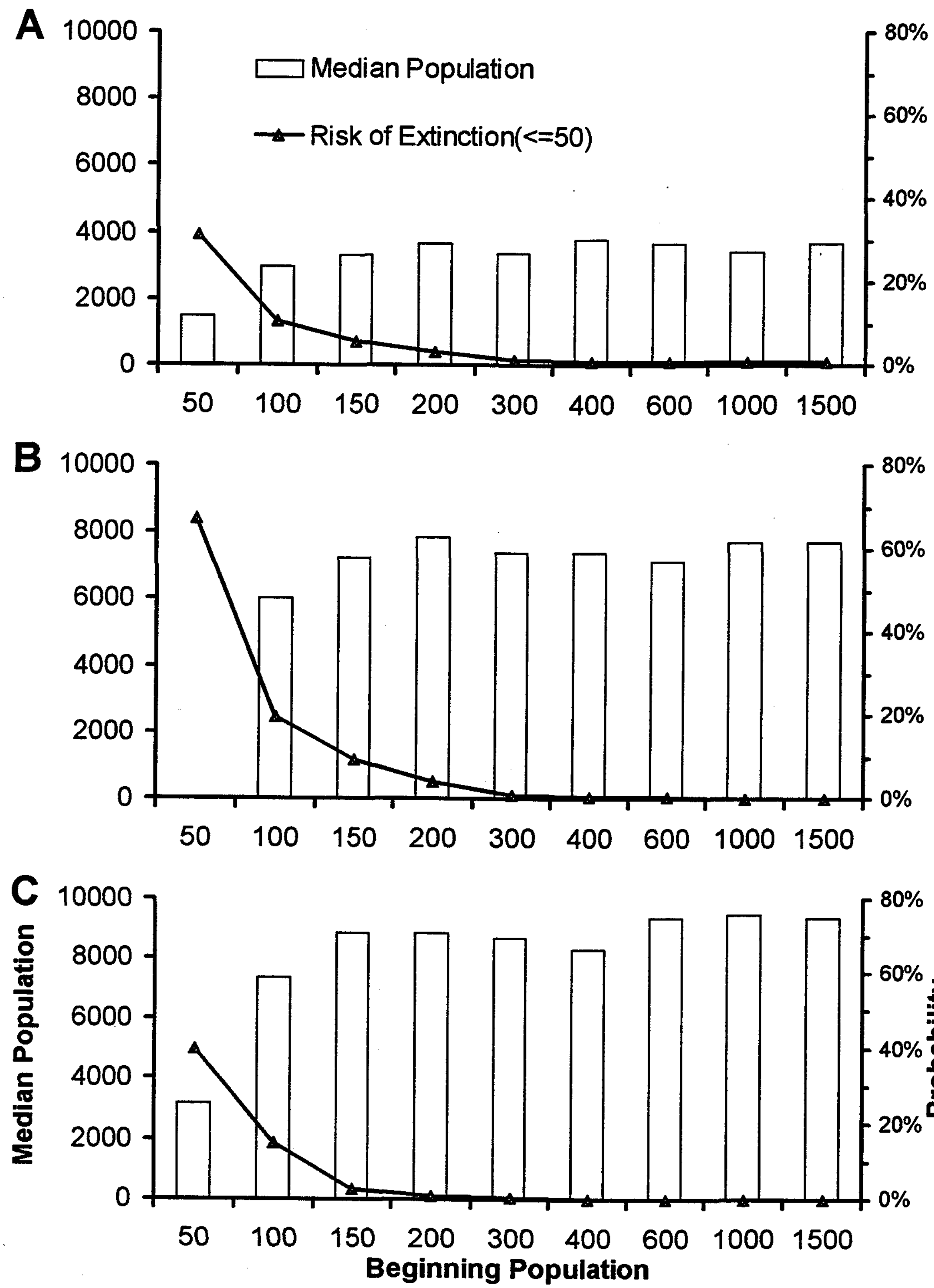


Figure 14. Median population size and probability of extinction predicted for model simulations of 33 generations with different levels of starting population for the (A) Tillamook, (B) Yaquina, and (C) Coos basins.

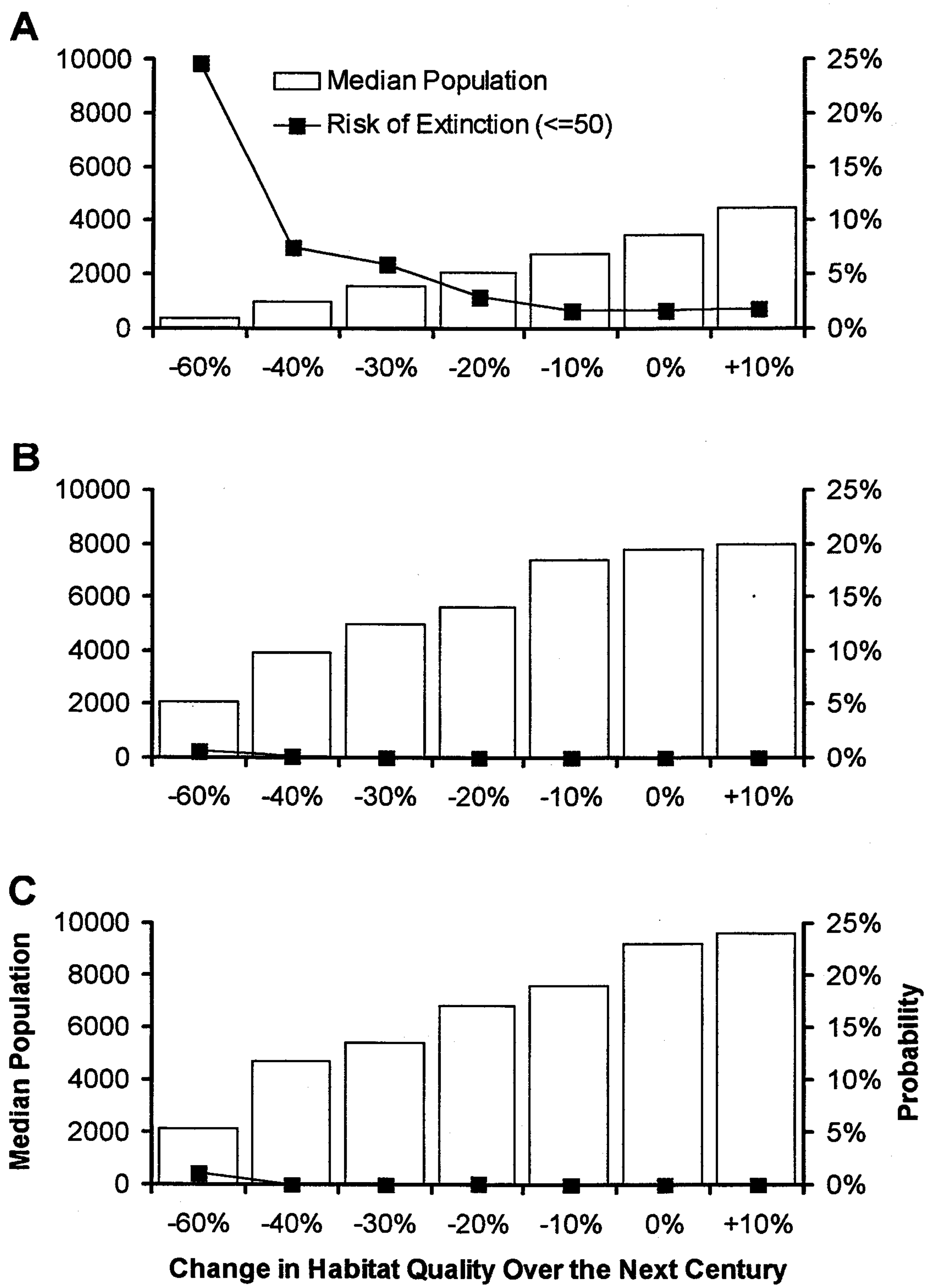


Figure 15. Median population size and probability of extinction predicted for model simulations of 33 generations with different levels of change in freshwater habitat quality for the (A) Tillamook, (B) Yaquina, and (C) Coos basins.

OCSRI Plan
Appendix IV: Core Area Mapping Documentation

- Maps
- List of Core Areas
- Documentation for each Core Area

Maps of Contemporary Core Areas of the Spawning and Rearing Distributions of Salmon and Steelhead in Oregon Coastal River Basins

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**A System Designed to Permit
Informed Choice-Making
for
Salmon Conservation and Restoration**

Oregon Department of Fish and Wildlife

**WORKING DRAFT
February 1997**

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
NECANICUM RIVER	MAIN STEM	NCCU1	CHUM	NECANICUM R	EXTENT OF CHUM HABITAT IN NECANICUM RIVER UPSTREAM TO (AND EXCLUDING) KLOOTCHIE CREEK
NECANICUM RIVER	MAIN STEM	NCCO1	COHO	NECANICUM R	EXTENT OF COHO HABITAT IN NECANICUM R AND BERGSVIK CREEK (AND ALL TRIBS) UPSTREAM OF CONFLUENCE
ECOLA CREEK	NORTH FORK	ECCO1	COHO	ECOLA CR, N FK	EXTENT OF COHO HABITAT (INCLUDING WEST FORK ECOLA CREEK)
NEHALEM RIVER	MAIN STEM	NCU1	CHUM	FOLEY CR	MOUTH-E FOLEY CR INCLUDING EAST FOLEY: EXTENT OF CHUM HABITAT
NEHALEM RIVER	MAIN STEM	NCO1	COHO	FOLEY CR	FOLEY CR: MOUTH OF EFK FOLEY CR-EXTENT OF COHO HAB INCLUDING TRIBS
NEHALEM RIVER	MAIN STEM	NSTW2	WINTER STEELHEAD	COOK CR	MOUTH-EXTENT OF HABITAT
NEHALEM RIVER	MAIN STEM	NCHF2	FALL CHINOOK	HUMBUG CR	MOUTH-E FK INCLUDING E FK TO EXTENT OF CHF HAB
NEHALEM RIVER	MAIN STEM	NCO3	COHO	FISHHAWK CR	FISHHAWK CR #2 :RESERVIOR-EXTENT OF COHO HABITAT INCLUDING TRIBS
NEHALEM RIVER	MAIN STEM	NCHS1	SPRING CHINOOK	NEHALEM R	MAINSTEM NEHALEM R: MOUTH OF FISHHAWK CR (FISHHAWK LAKE)-MOUTH OF ROCK CR AND MAINSTEM ROCK CR: MOUTH-FALL CR
NEHALEM RIVER	MAIN STEM	NCO4	COHO	DEER CR	MOUTH-EXTENT OF COHO HAB, INCLUDING TRIBS
NEHALEM RIVER	MAIN STEM	NCO6	COHO	CLEAR CR	MOUTH-EXTENT OF COHO HAB, INCLUDING TRIBS
NEHALEM RIVER	MAIN STEM	NCO7	COHO	NEHALEM R	UPPER NEHALEM R: MOUTH OF WOLF CR-EXTENT OF COHO HAB INCLUDIND TRIBS AND WOLF AND LOUISIGNONT WATERSHEDS
NEHALEM RIVER	NORTH FORK	NCU2	CHUM	ANDERSON CR	BOB'S, ANDERSON AND COAL CRS: MOUTHS EXTENT OF CHUM HABITAT
NEHALEM RIVER	NORTH FORK	NCHF4	FALL CHINOOK	SOAPSTONE CR	MOUTH-EXTENT OF CHF HABITAT

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
NEHALEM RIVER	NORTH FORK	NCO2	COHO	GODS VALLEY CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
NEHALEM RIVER	NORTH FORK	NCHF3	FALL CHINOOK	NEHALEM R, N FK	MOUTH OF LOST CR-MOUTH OF FALL CR
NEHALEM RIVER	SALMONBERRY RIVER	NCHF1	FALL CHINOOK	SALMONBERRY R	MOUTH-BELFORT CR; MAINSTEM ONLY
NEHALEM RIVER	SALMONBERRY RIVER	NSTW1	WINTER STEELHEAD	SALMONBERRY R	MOUTH-EXTENT OS STW HABITAT INCLUDING TRIBS
NEHALEM RIVER	ROCK CREEK	NSTW3	WINTER STEELHEAD	ROCK CR	MOUTH-EXTENT OF STW HABITAT INCLUDING TRIBS
NEHALEM RIVER	ROCK CREEK	NCO5	COHO	ROCK CR	MOUTH OF FALL CR-EXTENT OF COHO HAB, INCLUDING TRIBS, EXCLUDING FALL CR
MIAMI RIVER	MAIN STEM	TBCU1	CHUM	MOSS CR	EXTENT OF CHUM HABITAT
MIAMI RIVER	MAIN STEM	TBCU8	CHUM	MIAMI R	MOSS CR-MINICH CR
MIAMI RIVER	MAIN STEM	TBCU2	CHUM	MIAMI R	MIAMI BETWEEN MINICH CREEK AND PETERSEN CREEK
MIAMI RIVER	MAIN STEM	TBCO1	COHO	MIAMI R	MOUTH OF PETERSON CR-EXTENT OF COHO NABITAT, INCLUDING TRIBS AND PETERSON CR
MIAMI RIVER	MAIN STEM	TBCU3	CHUM	PROUTY CR	MOUTH TO EXTENT OF CHUM HABITAT
KILCHIS RIVER	MAIN STEM	TBCU4	CHUM	COAL CR	MOUTH TO EXTENT OF CHUM HABITAT
KILCHIS RIVER	MAIN STEM	TBCU5	CHUM	KILCHIS R	KILCHIS BETWEEN COAL CREEK AND MAPES CREEK
KILCHIS RIVER	MAIN STEM	TBCU9	CHUM	KILCHIS R	KILCHIS R: MAPLES CR-LITTLE S FORK; LITTLE S FORK: MOUTH-SAM DOWNS CR

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
KILCHIS RIVER	MAIN STEM	TBCU7	CHUM	CLEAR CR	MOUTH TO EXTENT OF CHUM HABITAT
KILCHIS RIVER	MAIN STEM	TBCO2	COHO	KILCHIS R, N FK	SCHROEDER CR -EXTENT OF COHO HABITAT, INCLUDING ALL TRIBS AND SCHROEDER CR
KILCHIS RIVER	LITTLE SOUTH FORK	TBCO3	COHO	KILCHIS R, LITTLE S FK	SAM DOWNS CR-EXTENT OF COHO HAB, INCLUDING SAM DOWNS CR
WILSON RIVER	MAIN STEM	TBCHF2	FALL CHINOOK	WILSON R	UPSTREAM FROM BEAVER CREEK TO DOWNSTREAM OF KANSAS CREEK
WILSON RIVER	MAIN STEM	TBCU10	CHUM	WILSON R	BEAVER CR-LITTLE N FORK
WILSON RIVER	MAIN STEM	TBCHS1	SPRING CHINOOK	WILSON R	BETWEEN (AND EXCLUDING) FOX AND MUESIAL CREEKS
WILSON RIVER	MAIN STEM	TBCHF3	FALL CHINOOK	WILSON R	BETWEEN (AND EXCLUDING) FOX AND MUESIAL CREEKS
WILSON RIVER	MAIN STEM	TBCHF4	FALL CHINOOK	WILSON R	BETWEEN (AND EXCLUDING) WOLF CREEK AND CEDAR CREEK
WILSON RIVER	MAIN STEM	TBCHS2	SPRING CHINOOK	WILSON R	BETWEEN (AND EXCLUDING) WOLF CREEK AND CEDAR CREEK
WILSON RIVER	MAIN STEM	TBCO4	COHO	CEDAR CR	CEDAR CR: MOUTH-EXTENT OF COHO HAB, INCLUDING TRIBS; N FK WILSON R: MOUTH-EXTENT OF COHO HAB, INCLUDING TRIBS
WILSON RIVER	MAIN STEM	TBCHF5	FALL CHINOOK	WILSON R	INCLUDES CEDAR CREEK DOWNSTREAM OF N. FK CEDAR CREEK TO WILSON RIVER, WILSON UPSTREAM TO N. FK WILSON RIVER AND N. FK WILSON
WILSON RIVER	LITTLE NORTH FORK	TBCU6	CHUM	WILSON R, N FK, LITTLE	FROM WILSON RIVER TO AND EXCLUDING WHITE CREEK
WILSON RIVER	LITTLE NORTH FORK	TBCHF1	FALL CHINOOK	WILSON R, N FK, LITTLE	FROM WILSON RIVER TO AND EXCLUDING WHITE CREEK
WILSON RIVER	DEVIL'S LAKE FORK	TBCO5	COHO	WILSON R, DEVIL'S LAKE FK	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
TRASK RIVER	MAIN STEM	TBCHF10	FALL CHINOOK	TRASK R	MILL CR-GOLD CR
TRASK RIVER	NORTH FORK	TBCHS3	SPRING CHINOOK	TRASK R, N FK	CR-CLEAR CR #3
TRASK RIVER	NORTH FORK	TBCHF8	FALL CHINOOK	TRASK R, N FK	BARK SHANTY CR-CLEAR CR #3; CR-CLEAR CR #3: MOUTH-UPSTREAM 1.0 MI
TRASK RIVER	NORTH FORK	TBCO6	COHO	ELKHORN CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
TRASK RIVER	SOUTH FORK	TBCHF6	FALL CHINOOK	EDWARDS CR	EXTENT OF CHF HABITAT
TRASK RIVER	SOUTH FORK	TBCHF9	FALL CHINOOK	TRASK R, S FK	EDWARDS CR-BILL CR
TILLAMOOK RIVER	MAIN STEM	TBCO7	COHO	TILLAMOOK R	BEAVER CR-EXTENT OF COHO HABITAT INCLUDING ALL TRIBS
TILLAMOOK RIVER	MAIN STEM	TBCU12	CHUM	TILLAMOOK R	BEWLEY CR-SIMMONS CR; BEWLEY CR: MOUTH-UPSTREAM 0.66 MI
TILLAMOOK RIVER	MAIN STEM	TBCHF7	FALL CHINOOK	TILLAMOOK R	EXTENT OF CHF HABITAT IN TILLAMOOK RIVER UPSTREAM OF (AND EXCLUDING) KILLAM CREEK TO BELOW MILLS CREEK, AND EXTENT OF CHF HABITAT IN
NESTUCCA RIVER	MAIN STEM AND BAY	NSCU2	CHUM	HORN CR	MOUTH-UPSTREAM 1 MILE
NESTUCCA RIVER	MAIN STEM AND BAY	NSCU1	CHUM	CLEAR CR	MOUTH-USFS BOUNDRY
NESTUCCA RIVER	MAIN STEM AND BAY	NSCO3	COHO	CLEAR CR	MOUTH TO EXTENT OF COHO HABITAT
NESTUCCA RIVER	MAIN STEM AND BAY	NSCHF3	FALL CHINOOK	CLEAR CR	MOUTH-USFS BOUNDRY
NESTUCCA RIVER	MAIN STEM AND BAY	NSCO1	COHO	EAST CR	MOUTH TO EXTENT OF COHO HABITAT INCLUDING TRIBS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
NESTUCCA RIVER	MAIN STEM AND BAY	NSCHF2	FALL CHINOOK	MOON CR	EXTENT OF CHF HABITAT
NESTUCCA RIVER	MAIN STEM AND BAY	NSCHS1	SPRING CHINOOK	NESTUCCA R	NESTUCCA CORRIDOR CONTIGUOUS WITH FEMAT REACHES UPSTREAM TO APPROX GINGER CREEK
NESTUCCA RIVER	MAIN STEM AND BAY	NSSTW1	WINTER STEELHEAD	NESTUCCA R	NESTUCCA CORRIDOR CONTIGUOUS WITH FEMAT REACHES UPSTREAM TO APPROX GINGER CREEK
NESTUCCA RIVER	MAIN STEM AND BAY	NSCHF1	FALL CHINOOK	NIAGARA CR	MOUTH TO (AND EXCLUDING) BUELAH CREEK
NESTUCCA RIVER	MAIN STEM AND BAY	NSCO2	COHO	ELK CR	MOUTH TO EXTENT OF COHO HABITAT
NESTUCCA RIVER	LITTLE NESTUCCA	NSCU3	CHUM	FALL CR	MOUTH-FIRST TRIB FROM SOUTH
NESTUCCA RIVER	LITTLE NESTUCCA	NSCO4	COHO	LITTLE NESTUCCA R	FALL CREEK EXTENT OF COHO HABITAT UPSTREAM TO AND INCLUDING BEAR CREEK #5 (AND TRIBS BETWEEN)
NESKOWIN CREEK	MAIN STEM	NWCU1	CHUM	NESKOWIN CR	FALL CR-LEWIS CR
SALMON RIVER	MAIN STEM AND BAY	SRCU2	CHUM	SALMON CR	MOUTH-CALKINS CR
SALMON RIVER	MAIN STEM AND BAY	SRCU3	CHUM	SALMON R	WILLIS CR-PANTHER CR
SALMON RIVER	MAIN STEM AND BAY	SRCHF1	FALL CHINOOK	SALMON R	WILLIS CR-PANTHER CR
SALMON RIVER	MAIN STEM AND BAY	SRCHF2	FALL CHINOOK	BEAR CR	MOUTH-SOUTHMAN CR
SALMON RIVER	MAIN STEM AND BAY	SRCU1	CHUM	BEAR CR	MOUTH-1ST UNNAMED TRIB ENTERING FROM EAST
SALMON RIVER	MAIN STEM AND BAY	SRSTW1	WINTER STEELHEAD	SALMON R	MOUTH OF SLICK ROCK CR-LITTLE SALMON R

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
SALMON RIVER	MAIN STEM AND BAY	SRCHF3	FALL CHINOOK	SALMON R	PRAIRIE CR-LITTLE SALMOM R
SILETZ RIVER	MAIN STEM	SCU1	CHUM	BEAR CR	MOUTH-EXTENT OF CHUM HABITAT
SILETZ RIVER	MAIN STEM	SCHF1	FALL CHINOOK	CEDAR CR	MOUTH-UPSTREAM 3.3 MILES
SILETZ RIVER	MAIN STEM	SCU2	CHUM	CEDAR CR	MOUTH-UPSTREAM 1.0 MILES
SILETZ RIVER	MAIN STEM	SSTW1	WINTER STEELHEAD	EUCHRE CR	MOUTH-FALLS (0.2'MI UPSTREAM FROM SAVAGE CR)
SILETZ RIVER	MAIN STEM	SCHF2	FALL CHINOOK	EUCHRE CR	MOUTH-UPSTREAM 3.6 MILES
SILETZ RIVER	MAIN STEM	SCHF3	FALL CHINOOK	SILETZ R	SILETZ RIVER:MOUTH OF EUCHRE CR-MILL CR (TOWN)
SILETZ RIVER	MAIN STEM	S1	COHO	DEWEY CR	DEWEY AND MILL CREEKS: MOUTHS-EXTENT OF COHO HABITAT INCLUDING TRIBS
SILETZ RIVER	MAIN STEM	S2	COHO	BENTILLA CR	MOUTH-EXTENT OF COHO HABITAT
SILETZ RIVER	MAIN STEM	S3	COHO	SAM CR	SAM CREEK: MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
SILETZ RIVER	MAIN STEM	S4	COHO	MILL CR	MILL CR WATERSHED: MOUTH EXTENT OF COHO HAB INCLUDING TRIBS
SILETZ RIVER	MAIN STEM	S6	COHO	PALMER CR	MOUTH TO EXTENT OF COHO HABITAT
SILETZ RIVER	MAIN STEM	SCHF4	FALL CHINOOK	SILETZ R	SILETZ R: MOUTH OF WOLFER CR TO FALLS CR
SILETZ RIVER	MAIN STEM	SCHS1	SPRING CHINOOK	SILETZ R	SILETZ R: MOUTH OF WOLFER CR TO FALLS CR

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
SILETZ RIVER	MAIN STEM	SSTW2	WINTER STEELHEAD	SILETZ R	SILETZ R: MOUTH OF WOLFER CR TO FALLS CR
SILETZ RIVER	MAIN STEM	SCHF7	FALL CHINOOK	SUNSHINE CR	MOUTH-FOURTH OF JULY CR
SILETZ RIVER	MAIN STEM	SSTW4	WINTER STEELHEAD	SUNSHINE CR	MOUTH-EXTENT OF STW HABITAT INCLUDING TRIBS
SILETZ RIVER	MAIN STEM	S5	COHO	SUNSHINE CR	SUNSHINE CREEK: MOUTH-EXTENT OF COHO HABITAT INCLUDING ALL TRIBS
SILETZ RIVER	ROCK CREEK	SCHF6	FALL CHINOOK	BIG ROCK CR	MOUTH-FALL CR
SILETZ RIVER	NORTH FORK	SSTS1	SUMMER STEELHEAD	SILETZ R, N FK	NORTH FORK: MOUTH-UPSTREAM 8 MILES; WARNICK CR: MOUTH-UPSTREAM 1.5 MILES; BOULDER CR: MOUTH-LITTLE BOULDER CR
SILETZ RIVER	DRIFT CREEK	SCHF8	FALL CHINOOK	DRIFT CR	DRIFT CR:GORDEY CR-USFS LAND BOUNDRY
SILETZ RIVER	DRIFT CREEK	SSTW3	WINTER STEELHEAD	DRIFT CR	DRIFT CR: MORTHCR-SAMPSON CR
SILETZ RIVER	DRIFT CREEK	SCHF5	FALL CHINOOK	DRIFT CR	DRIFT CR: NORTH CR-SAMPSON CR
YAQUINA RIVER	MAIN STEM AND BAY	YCO1	COHO	MILL CR	MILL CR DRAINAGE INCLUDING TRIBS AND RESIVOR: MOUTH-EXTENT OF COHO HABITAT
YAQUINA RIVER	MAIN STEM AND BAY	YCU1	CHUM	MILL CR	MOUTH-FORKS(DAM), INCLUDING LOWER 0.8 MILES OF TRIB A
YAQUINA RIVER	MAIN STEM AND BAY	YSTW1	WINTER STEELHEAD	MILL CR	MOUTH-EXTENT OF STW HABITAT, INCLUDING TRIBS
YAQUINA RIVER	MAIN STEM AND BAY	YCHF1	FALL CHINOOK	SIMPSON CR	MOUTH-COOK CR
YAQUINA RIVER	MAIN STEM AND BAY	YCU2	CHUM	SIMPSON CR	MOUTH-MOUTH OF COOK CR

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
YAQUINA RIVER	MAIN STEM AND BAY	YCO2	COHO	THORNTON CR	SIMPSON, THORNTON & HAYES CRS: MOUTHS-EXTENT OF COHO HAB INCLUDING TRIBS
YAQUINA RIVER	MAIN STEM AND BAY	YCO8	COHO	BALES CR	MOUTH-EXTENT OF COHO HABITAT; INCLUDING TRIBS
YAQUINA RIVER	MAIN STEM AND BAY	YCHF6	FALL CHINOOK	BALES CR	MOUTH-UPSTREAM 1 MI; E FK: MOUTH-UPSTREAM 1 MI
YAQUINA RIVER	MAIN STEM AND BAY	YCO3	COHO	BUTTERMILK CR	MOUTH-EXTENT OF COHO HAB INCLUDING TRIBS
YAQUINA RIVER	MAIN STEM AND BAY	YCHF2	FALL CHINOOK	YAQUINA R	YOUNG CR-FALLS
YAQUINA RIVER	MAIN STEM AND BAY	YSTW2	WINTER STEELHEAD	YAQUINA R	UPPER YAQUINA R: SPLIDE CR-FALLS
YAQUINA RIVER	MAIN STEM AND BAY	YCO4	COHO	YAQUINA R	UPPER YAQUINA R: SPLIDE CR-FALLS (EXTENT OF COHO HAB)
YAQUINA RIVER	ELK CREEK	YCO7	COHO	DEER CR	MOUTH-EXTENT OF COHO HABITAT; INCLUDING TRIBS
YAQUINA RIVER	ELK CREEK	YCHF5	FALL CHINOOK	DEER CR	MOUTH-UPSTREAM 1.5 MI
YAQUINA RIVER	ELK CREEK	YSTW3	WINTER STEELHEAD	WOLF CR	WOLF CR WATERSHED: MOUTHS-EXTENT OFSTWAB INCLUDING TRIBS
YAQUINA RIVER	ELK CREEK	YCO5	COHO	WOLF CR	WOLF & SPOUT CRS WATERSHEDS: MOUTHS-EXTENT OF COHO HAB INCLUDING TRIBS
YAQUINA RIVER	ELK CREEK	YCHF3	FALL CHINOOK	ELK CR	BIG ELK CR:GRANT CR-SUGARBOWL CR; GRANT CR:MOUTH-SAVAGE CR; FEAGLES CR: MOUTH-W FK.
YAQUINA RIVER	LITTLE ELK CREEK	YCHF4	FALL CHINOOK	SALMON CR	MOUTH-UPSTREAM 1.5 MI
YAQUINA RIVER	LITTLE ELK CREEK	YCO6	COHO	SALMON CR	MOUTH-EXTENT OF COHO HABITAT

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
BEAVER CREEK	NORTH FORK	BCCO1	COHO	BEAVER CR, N FK	MOUTH OF PETERSON CR-EXTENT OF COHO HABITAT
ALSEA RIVER	MAIN STEM AND BAY	ALCU1	CHUM	CANAL CR	MOUTH-BEAR CR
ALSEA RIVER	MAIN STEM AND BAY	ALCHS1	SPRING CHINOOK	ALSEA R	MAINSTEM ALSEA: MOUTH OF FALL CR-NORTH FORK, N FK ALSEA: MOUTH-HONEY GROVE CR
ALSEA RIVER	MAIN STEM AND BAY	ALCHF3	FALL CHINOOK	ALSEA R	MAINSTEM ALSEA: MOUTH OF FALL CR-NORTH FORK, N FK ALSEA: MOUTH-HONEY GROVE CR
ALSEA RIVER	DRIFT CREEK	ALCHF1	FALL CHINOOK	DRIFT CR	DRIFT CR: GOLD CR-MEDOW CR
ALSEA RIVER	DRIFT CREEK	ALCO1	COHO	DRIFT CR	DRIFT CR: MOUTH OF MEDOW CR-EXTENT OF COHO HABITAT INCLUDING ALL TRIBS IN DRIFT AND MEDOW CR
ALSEA RIVER	FIVE RIVERS	ALCHF2	FALL CHINOOK	LOBSTER CR	LOBSTER CR: LITTLE LOBSTER-MEADOW CR
ALSEA RIVER	FIVE RIVERS	ALCO3	COHO	LOBSTER CR	MOUTH OF COOK CR-FORKS, INCLUDING FORKS, EXTENT OF COHO HABITAT
ALSEA RIVER	FIVE RIVERS	ALCO2	COHO	FIVE RIVERS	FIVR RIVERS: CASCADE CR-EXTENT OF COHO HABITAT, INCLUDING ALL TRIBS
ALSEA RIVER	FIVE RIVERS	ALCHF4	FALL CHINOOK	FIVE RIVERS	FIVE RIVERS:BUCK CR-GREEN RIVER; BUCK CR:MOUTH-WILSON CR
ALSEA RIVER	SOUTH FORK	ALCO4	COHO	TOBE CR	TOBE CR, ROCK CR, PEAK CR: MOUTHS EXTENT OF COHO HABITAT
YACHATS RIVER	MAIN STEM	YACO2	COHO	YACHATS R, SCHOOL FK	MOUTH-EXTENT OF COHO HABITAT
YACHATS RIVER	NORTH FORK	YACO1	COHO	YACHATS R, N FK	N FK YACHATS: FISH CR-EXTENT OF COHO HABITAT INCLUDING FISH CR AND ALL OTHER TRIBS
SIUSLAW RIVER	MAIN STEM	SUCHF5	FALL CHINOOK	SWEET CR	EXTENT OF CHF HABITAT IN SWEET CREEK DOWNSTREAM OF CEDAR CREEK #2

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
SIUSLAW RIVER	MAIN STEM	SUCO7	COHO	SWEET CR	EXTENT OF COHO HABITAT IN ALL TRIBS DOWNSTREAM OF (AND EXCLUDING) FALL CREEK
SIUSLAW RIVER	MAIN STEM	SUSTW5	WINTER STEELHEAD	SAN ANTONE CR	MOUTH-EXTENT OF STW HABITAT
SIUSLAW RIVER	MAIN STEM	SUCO6	COHO	MILLER CR	EXTENT OF COHO HABITAT IN HAYNES, MILLER, AND KNAPP CREEKS
SIUSLAW RIVER	MAIN STEM	SUCHF8	FALL CHINOOK	SIUSLAW R	EXTENT OF CHF HABITAT IN SIUSLAW RIVER FROM WILDCAT CK UPSTREAM TO ESMOND CK
SIUSLAW RIVER	MAIN STEM	SUCHF7	FALL CHINOOK	WHITTAKER CR	EXTENT OF CHF HABITAT IN WHITTAKER CREEK UPSTREAM TO FIRST MAJOR TRIB (ENTERING FROM WEST) ABOVE BOUNDS CREEK
SIUSLAW RIVER	MAIN STEM	SUSTW6	WINTER STEELHEAD	ESMOND CR	MOUTH-EXTENT OF STW HABITAT, INCLUDING TRIBS
SIUSLAW RIVER	MAIN STEM	SUCHF6	FALL CHINOOK	ESMOND CR	EXTENT OF CHF HABITAT IN ESMOND CREEK UPSTREAM TO COX CREEK
SIUSLAW RIVER	MAIN STEM	SUCO3	COHO	SIUSLAW R	EXTENT OF COHO HABITAT UPSTREAM OF (AND INCLUDING) DOGWOOD CREEK TO (AND INCLUDING) DOUGLAS CREEK
SIUSLAW RIVER	NORTH FORK	SUCO1	COHO	SIUSLAW R, N FK	EXTENT OF COHO HABITAT IN MORRIS AND CONDON CREEKS AND THEIR TRIBS; DOES NOT INCLUDE N. FK SIUSLAW
SIUSLAW RIVER	NORTH FORK	SUCO2	COHO	SIUSLAW R, N FK	EXTENT OF COHO HABITAT, INCLUDING MCLEOD CREEK AND ALL TRIBS UPSTREAM
SIUSLAW RIVER	NORTH FORK	SUCHF3	FALL CHINOOK	SIUSLAW R, N FK	EXTENT OF CHF HABITAT (EXCLUDING TRIBS) UPSTREAM TO BELOW ELMA CREEK
SIUSLAW RIVER	LAKE CREEK	SUCHF2	FALL CHINOOK	INDIAN CR	INDIAN CK UPSTREAM TO N FK. INDIAN CK, AND W. FK INDIAN CK UPSTREAM TO MARIA CK (INCLUDING LOWER PORTIONS OF ROGERS CK)
SIUSLAW RIVER	LAKE CREEK	SUCO4	COHO	INDIAN CR	EXTENT OF COHO HABITAT UPSTREAM FROM (AND INCLUDING) CREMO CREEK
SIUSLAW RIVER	LAKE CREEK	SUSTW1	WINTER STEELHEAD	INDIAN CR, W FK	MOUTH-EXTENT OF STW HABITAT, INCLUDING TRIBS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
SIUSLAW RIVER	LAKE CREEK	SUCHF1	FALL CHINOOK	LAKE CR	UPSTREAM TO FISH CREEK AND INCLUDING LOWER PORTIONS (~1 MI) OF NELSON, GREENLEAF, AND FISH CREEKS
SIUSLAW RIVER	LAKE CREEK	SUSTW2	WINTER STEELHEAD	GREEN CR	MOUTH-EXTENT OF STW HABITAT
SIUSLAW RIVER	LAKE CREEK	SUCHF4	FALL CHINOOK	DEADWOOD CR	EXTENT OF CHF HABITAT IN DEADWOOD CK UPSTREAM TO (AND EXCLUDING) N FK PANTHER CK, AND W FK DEADWOOD CK UPSTREAM TO (AND EXCLUDING)
SIUSLAW RIVER	LAKE CREEK	SUCO5	COHO	DEADWOOD CR	EXTENT OF COHO HABITAT IN ALL TRIBS UPSTREAM FROM (AND INCLUDING) WEST FK DEADWOOD CK
SIUSLAW RIVER	LAKE CREEK	SUSTW3	WINTER STEELHEAD	GREENLEAF CR	MOUTH-EXTENT OF STW HABITAT, INCLUDING TRIBS
SIUSLAW RIVER	LAKE CREEK	SUSTW4	WINTER STEELHEAD	FISH CR	MOUTH-EXTENT OF STW HABITAT, INCLUDING TRIBS
SILTCOOS RIVER	MAPLE CREEK	SCCO1	COHO	MAPLE CR	HENDERSON CR-EXTENT OF COHO HABITAT, INCLUDING TRIBS AND HENDERSON CR
SILTCOOS RIVER	FIDDLE CREEK	SCCO2	COHO	ALDER CR	MOUTH-EXTENT OF COHO HABITAT
SILTCOOS RIVER	FIDDLE CREEK	SCCO3	COHO	FIDDLE CR	MOUTH OF MORRIS CR-EXTENT OF COHO HABITAT
TAHKENITCH CREEK	FIVEMILE CREEK	TKCO1	COHO	FIVEMILE CR	START OF DSLESH (1/4 MILE DOWNSTREAM FROM HARRY CR)-EXTENT OF COHO HABITAT, INCLUDING TRIBS
TAHKENITCH CREEK	LEITEL CREEK	TKCO2	COHO	MALLARD CR	START OF DSLESH-EXTENT OF COHO HABITAT
UMPQUA RIVER	MAIN STEM AND BAY	UMCO1	COHO	SCHOLFIELD CR	SCHOLFIELD AND DEAN CRS: MOUTHS-EXTENT OF COHO HABITAT INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCHF2	FALL CHINOOK	SMITH R, N FK	MOUTH OF JOHNSON CR-WEST BRANCH, INCLUDING JOUNSON CR AND WEST BRANCH TO EXTENT OF CHF HABITAT
UMPQUA RIVER	SMITH RIVER	UMCO4	COHO	SMITH R, N FK	GEORGA CR-EXTENT OF COHO HABITAT INCLUDING TRIBS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
UMPQUA RIVER	SMITH RIVER	UMCHF1	FALL CHINOOK	WASSEN CR	MOUTH-EXTENT OF CHF HABITAT
UMPQUA RIVER	SMITH RIVER	UMCO2	COHO	WASSEN CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCHF3	FALL CHINOOK	BUCK CR	MOUTH-EXTENT OF CHF HABITAT
UMPQUA RIVER	SMITH RIVER	UMCO3	COHO	BUCK CR	BUCK AND VINCENT CR: MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCHF4	FALL CHINOOK	SMITH R, W FK	MOUTH-GOLD CR
UMPQUA RIVER	SMITH RIVER	UMCO5	COHO	SMITH R, W FK	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCO6	COHO	TWIN SISTER CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCO7	COHO	BIG CR	MOUTH-EXTENT OF HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SMITH RIVER	UMCO8	COHO	SMITH R, S FK	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	ELK CREEK	UMCO9	COHO	BRUSH CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	ELK CREEK	UMPCO1 1	COHO	SAND CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
UMPQUA RIVER	NORTH UMPQUA	NUMCHS 1	SPRING CHINOOK	N UMPQUA R	SUTHERLIN CR-SETAMBOAT CR
UMPQUA RIVER	NORTH UMPQUA	NUMSTW 1	WINTER STEELHEAD	N UMPQUA R	LITTLE RIVER-MEDICINE CR
UMPQUA RIVER	NORTH UMPQUA	NUMSTS 1	SUMMER STEELHEAD	STEAMBOAT CR	MOUTH-EXTENT OF STS HABITAT, INCLUDING TRIBS

PROVISIONAL CORE AREAS FOR ANADROMOUS SALMONIDS IN OREGON COASTAL STREAMS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
UMPQUA RIVER	SOUTH UMPQUA	SUMCHF1	FALL CHINOOK	S UMPQUA R	MOUTH OF S UMPQUA R-COW CR
UMPQUA RIVER	SOUTH UMPQUA	SUMCHF2	FALL CHINOOK	COW CR	MOUTH-W FK COW CR
UMPQUA RIVER	SOUTH UMPQUA	SUMCO1	COHO	COW CR, W FK	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
UMPQUA RIVER	SOUTH UMPQUA	SUMCO2	COHO	MIDDLE CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
UMPQUA RIVER	SOUTH UMPQUA	SUMSTW 1	WINTER STEELHEAD	S UMPQUA R	MOUTH OF ELK CR-EXTENT OF STW HABITAT INCLUDING TRIBS AND ELK CR
UMPQUA RIVER	SOUTH UMPQUA	SUMCHS 2	SPRING CHINOOK	JACKSON CR	MOUTH-FALCON CR
UMPQUA RIVER	SOUTH UMPQUA	SUMCHS 1	SPRING CHINOOK	S UMPQUA R	JACKSON CR-FIRST MAJOR TRIB FROM SOUTH UPSTREAM FROM FISH LAKE CR; BLACK LAKE FK TO MINK CR
UMPQUA RIVER	CALAPOOYA CREEK	UMCO10	COHO	CALAPOOYA CR	MOUTH OF COON CR-EXTENT OF COHO HABITAT, INCLUDING TRIBS AND COON CR
TENMILE CREEK	NORTH TENMILE LAKE	TMLCO1	COHO	NOBLE CR	NOBLE AND BIG CRS: MOUTHS-EXTENT OF COHO HABITAT, INCLUDING TRIBS
TENMILE CREEK	SOUTH TENMILE LAKE	TMLCO2	COHO	JOHNSON CR	JOHNSON CR: MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
COOS RIVER	MAIN STEM	CBCO1	COHO	LARSON CR	LARSON AND PALOUSE CRS: MOUTHS-EXTENT OF COHO HABITAT INCLUDING TRIBS
COOS RIVER	MILLICOMA RIVER	CBCHF2	FALL CHINOOK	MILLICOMA R, E FK	E FK MILLICOMA R: HODGES CR-FOX CR; GLENN CR: MOUTH-DARLUS CR
COOS RIVER	MILLICOMA RIVER	CBCO3	COHO	MILLICOMA R, E FK	E FK MILLACOMA: GLENN CR-EXTENT OF COHO HABITAT, INCLUDING ALL TRIBS AND GLENN CR
COOS RIVER	MILLICOMA RIVER	CBSTW2	WINTER STEELHEAD	MILLICOMA R, E FK	E FK MILLACOMA: GLENN CR-EXTENT OF COHO HABITAT, INCLUDING ALL TRIBS AND GLENN CR

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
COOS RIVER	MILLICOMA RIVER	CBCHF3	FALL CHINOOK	MILLICOMA R, W FK	RAINY CR-TOTEN CR
COOS RIVER	MILLICOMA RIVER	CBSTW1	WINTER STEELHEAD	MILLICOMA R, W FK	W FK MILLICOMA: TROUT CR-EXTENT OF COHO HABITAT, INCLUDING TRIBS
COOS RIVER	MILLICOMA RIVER	CBCO4	COHO	MILLICOMA R, W FK	W FK MILLICOMA: TROUT CR-EXTENT OF COHO HABITAT, INCLUDING TRIBS
COOS RIVER	SOUTH FORK	CBCO2	COHO	DANIELS CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
COOS RIVER	SOUTH FORK	CBCHF1	FALL CHINOOK	COOS R, S FK	S FK COOS R: COX CR-COAL CR
COOS RIVER	SOUTH FORK	CBSTW3	WINTER STEELHEAD	TIOGA CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
COOS RIVER	SOUTH FORK	CBCHF4	FALL CHINOOK	TIOGA CR	MOUTH-EXTENT OF CHF HABITAT
COOS RIVER	SOUTH FORK	CBCO5	COHO	TIOGA CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
COOS RIVER	SOUTH FORK	CBCO6	COHO	CEDAR CR	CEDAR CR: MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
COOS RIVER	SOUTH FORK	CBCHF5	FALL CHINOOK	WILLIAMS R	WILLIAMS R: CEDAR CR-FALL CR
COQUILLE RIVER	NORTH FORK	CQCHF2	FALL CHINOOK	MIDDLE CR	MOUTH-ALDER CR
COQUILLE RIVER	NORTH FORK	CQCO2	COHO	MIDDLE CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
COQUILLE RIVER	NORTH FORK	CQCHF1	FALL CHINOOK	COQUILLE R, N FK	N FK COQUILLE:HUDSON CR-N FK CR, EXCLUDING TRIBS
COQUILLE RIVER	NORTH FORK	CQCO1	COHO	COQUILLE R, N FK	N FK COQUILLE: HUDSON CR-EXTENT OF COHO HABITAT, INCLUDING HUDSON CR AND ALL OTHER TRIBS UPSTREAM

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
COQUILLE RIVER	EAST FORK	CQCHF3	FALL CHINOOK	COQUILLE R, E FK	E FK COQUILLE: YANKEE RUN CR-MAPLE CR
COQUILLE RIVER	EAST FORK	CQCO3	COHO	HANTZ CR	HANTZ, STEEL, BILLS AND CHINA CRS: MOUTHS-EXTENT OF COHO HABITAT
COQUILLE RIVER	MIDDLE FORK	CQCO4	COHO	BIG CR	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
COQUILLE RIVER	MIDDLE FORK	CQCHF5	FALL CHINOOK	ROCK CR	ROCK CR: MOUTH-SHIELDS CR AND LOWER PORTION (DSLESH) OF RASLER CR
COQUILLE RIVER	MIDDLE FORK	CQCHF4	FALL CHINOOK	COQUILLE R, M FK	MD FK COQUILLE: BELIEU CR-SLATER CR
COQUILLE RIVER	MIDDLE FORK	CQCO5	COHO	SANDY CR	MOUTH-EXTENT OF HABITAT, INCLUDING TRIBS
COQUILLE RIVER	MIDDLE FORK	CQCO6	COHO	SLATER CR	MOUTH-EXTENT OF COHO HABITAT
COQUILLE RIVER	SOUTH FORK	CQCHS1	SPRING CHINOOK	COQUILLE R, S FK	BEAVER CR-FALLS
COQUILLE RIVER	SOUTH FORK	CQSTW1	WINTER STEELHEAD	COQUILLE R, S FK	BEAVER CR-FALLS, INCLUDING ALL TRIBS TO THE EXTENT OF STW HABITAT
COQUILLE RIVER	SOUTH FORK	CQCHF6	FALL CHINOOK	COQUILLE R, S FK	S FK: BEAVER CR-COAL CR; SALMON CR: MOUTH-TWO BY FOUR CR
COQUILLE RIVER	SOUTH FORK	CQCO7	COHO	SALMON CR	MOUTH-EXTENT OF CO HABITAT, INCLUDING TRIBS
FOURMILE CR	MAIN STEM	NRCO1	COHO	FOURMILE CR	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
NEW RIVER	CROFT LAKE	NRCO2	COHO	DAVIS CR	DAVIS, BETHEL, BUTTE AND MORTON CRS: MOUTHS-EXTENT OF COHO HABITAT, INCLUDING TRIBS
FLORAS CREEK	MAIN STEM	FCCO1	COHO	WILLOW CR	MOUTH-EXTENT OF CO HABITAT

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
FLORAS CREEK	MAIN STEM	FCCHF1	FALL CHINOOK	FLORAS CR	MOUTH OF WILLOW CR-EXTENT OF HABITAT, INCLUDING WILLOW CR
SIXES RIVER	MAIN STEM	SXCO1	COHO	CRYSTAL CR	MOUTH-EXTENT OF COHO HABITAT
SIXES RIVER	MAIN STEM	SXCO4	COHO	EDSON CR	MOUTH-EXTENT OF CO HABITAT
SIXES RIVER	MAIN STEM	SXCHF1	FALL CHINOOK	EDSON CR	MOUTH-EXTENT OF CHF HABITAT
SIXES RIVER	MAIN STEM	SXCHF2	FALL CHINOOK	DRY CR	MOUTH-EXTENT OF CHF HABITAT
SIXES RIVER	MAIN STEM	SXCO2	COHO	DRY CR	MOUTH-NORTH FK (EXTENT OF CO HABITAT)
SIXES RIVER	MAIN STEM	SXCHF3	FALL CHINOOK	SIXES R	SIXES RIVER:BIG CR-N FK SIXES R
SIXES RIVER	MIDDLE FORK	SXCHF4	FALL CHINOOK	SIXES R, M FK	M FK SIXES R: MOUTH-EXTENT OF CHF HABITAT
SIXES RIVER	NORTH FORK	SXCO3	COHO	SIXES R, N FK	SIXES RIVER: HAINES (HAYS) CR-EXTENT OF COHO HABITAT, INCLUDING TRIBS
ELK RIVER	MAIN STEM	ERCHF1	FALL CHINOOK	ELK R	ELK R:ROCK CR-BALD MOUTIAN CR; ROCK CR: MOUTH-EXTENT OF CHF HABITAT; ANVIL CR: MOUTH-EXTENT OF CHF HABITAT
ELK RIVER	MAIN STEM	ERSTW1	WINTER STEELHEAD	ELK R	MOUTH OF BALD MOUTAIN CR-EXTENT OF STW HABITAT, INNCLUDING ALL TRIBS
ELK RIVER	MAIN STEM	ERCHF2	FALL CHINOOK	ELK R	ELK RIVER: SLATE CR-SUNSHINE CR; RED CEDAR CR: MOUTH EXTENT OF CHF HABITAT
ELK RIVER	MAIN STEM	ERCHF3	FALL CHINOOK	ELK R	ELK R: BUTLER CR-N FK
ELK RIVER	MAIN STEM	ERCHF4	FALL CHINOOK	ELK R, N FK	MOUTH-FIRST MAJOR TRIBFROM NORTH

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
EUCHRE CREEK	MAIN STEM	EUCHF2	FALL CHINOOK	CEDAR CR	MOUTH-MILLER CR
EUCHRE CREEK	MAIN STEM	EUCHF1	FALL CHINOOK	EUCHRE CR	EUCHRE CR: MOUTH OF CREW CANYON CR-MOUTH OF SECOND MAJOR TRIB FROM EAST
ROGUE RIVER	MAIN STEM	LRCO3	COHO	QUOSATANA CR	MOUTH-EXTENT OF COHO HABITAT
ROGUE RIVER	MAIN STEM	LRCHF2	FALL CHINOOK	QUOSATANA CR	MOUTH-FIRST TRIBUTARY
ROGUE RIVER	MAIN STEM	LRCO1	COHO	SILVER CR	MOUTH-EXTENT OF COHO HABITAT
ROGUE RIVER	MAIN STEM	LRCHF3	FALL CHINOOK	SHASTA COSTA CR	MOUTH-SECOND TRIB FROM NORTH
ROGUE RIVER	MAIN STEM	LRCO5	COHO	QUARTZ CR	MOUTH-UPSTREAM3.5 MILES
ROGUE RIVER	MAIN STEM	LRCO4	COHO	LIMPY CR	MOUTH-USFS LAND BOUNDRY
ROGUE RIVER	MAIN STEM	LRCHF5	FALL CHINOOK	ROGUE R	START ON LOWER ROGUE MAP-HOG CR
ROGUE RIVER	MAIN STEM	MRCHF2	FALL CHINOOK	EVANS CR	MOUTH-PLEASANT CR
ROGUE RIVER	MAIN STEM	MRCO1	COHO	EVANS CR, W FK	MOUTH-EXTENT OF COHO HABITAT INCLUDING TRIBS
ROGUE RIVER	MAIN STEM	MRSTW1	WINTER STEELHEAD	EVANS CR, W FK	MOUTH-EXTENT OD STW HABITAT INCLUDING TRIBS
ROGUE RIVER	MAIN STEM	MRSTS1	SUMMER STEELHEAD	FOOTS CR	FOOTS, SARDINE, GALLS, KANE AND SAMS CRS: MOUTH-EXTENT OF STS HABITAT
ROGUE RIVER	MAIN STEM	MRCHF3	FALL CHINOOK	ROGUE R	FOOTS CR-THE CANYON

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
ROGUE RIVER	MAIN STEM	MRCHF1	FALL CHINOOK	ROGUE R	BEAR CR-START OF ROGUE R ON MIDDLE ROGUE MAP
ROGUE RIVER	MAIN STEM	MRCHS1	SPRING CHINOOK	ROGUE R	BEAR CR-START OF ROGUE R ON MIDDLE ROGUE MAP
ROGUE RIVER	MAIN STEM	URSTS1	SUMMER STEELHEAD	ANTELOPE CR	MOUTH-EXTENT OF STS HABITAT, INCLUDING TRIBS
ROGUE RIVER	MAIN STEM	URCO1	COHO	LITTLE BUTTE CR	SALT CR-S FORK; S FORK: MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS ON MAINSTEM AND S FORK
ROGUE RIVER	MAIN STEM	URCHS1	SPRING CHINOOK	ROGUE R	LITTLE BUTTE CR-.25 MILE UPSTREAM FROM BIG BUTTE CR
ROGUE RIVER	MAIN STEM	URCO4	COHO	TRAIL CR	CANYON CR (TRAIL CR): MOUTH-UPSTREAM .5 MILE; W FK TRAIL CR:MOUTH-CHICAGO CR
ROGUE RIVER	MAIN STEM	URCO3	COHO	ELK CR, W BR	MOUTH-MORINE CR
ROGUE RIVER	MAIN STEM	URCO2	COHO	ELK CR	ALCO CR-BUTTON CR; SUGAR PINE CR: MOUTH-KETTLE CR
ROGUE RIVER	LOBSTER CREEK	LRCHF1	FALL CHINOOK	LOBSTER CR	MOUTH-FORKS
ROGUE RIVER	LOBSTER CREEK	LRCHF4	FALL CHINOOK	LOBSTER CR, S FK	MOUTH-IRON CR
ROGUE RIVER	LOBSTER CREEK	LRCO2	COHO	LOBSTER CR, S FK	MOUTH-EXTENT OF COHO HABITAT, INCLUDING TRIBS
ROGUE RIVER	ILLINOIS RIVER	ILCHF1	FALL CHINOOK	ILLINOIS R	REEVS CR-FORKS
ROGUE RIVER	ILLINOIS RIVER	ILCHF3	FALL CHINOOK	ILLINOIS R, W FK	MOUTH-FIRST UNNAMED TRIB UPSTREAM FROM LEUIZENGER CR
ROGUE RIVER	ILLINOIS RIVER	ILCO1	COHO	ELK CR	MOUTH-BROKEN KETTLE CR, INCLUDING COHO HABITAT IN TRIBS

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
ROGUE RIVER	ILLINOIS RIVER	ILCHF2	FALL CHINOOK	ILLINOIS R, E FK	MOUTH-DUNN CR
ROGUE RIVER	ILLINOIS RIVER	ILCO2	COHO	SUCKER CR	BEAR CR-FIRST UNNAMED TRIB UPSTREAM FROM YEAGER CR;GRAYBACK CR: MOUTH-WHITE ROCK CR
ROGUE RIVER	ILLINOIS RIVER	ILCO3	COHO	ALTHOUSE CR	DEMOCRAT GULTCH-WEST FORK
ROGUE RIVER	ILLINOIS RIVER	ILCO4	COHO	DUNN CR	MOUTH-NORTH FORK
ROGUE RIVER	APPLEGATE RIVER	APPCHF1	FALL CHINOOK	APPLEGATE R	MOUTH-THOMPSON CR
ROGUE RIVER	APPLEGATE RIVER	APPCHF2	FALL CHINOOK	SLATE CR	MOUTH-ELLIOT CR
ROGUE RIVER	APPLEGATE RIVER	APPCO1	COHO	WATERS CR	MOUTH-EXTENT OF COHO HABITAT
ROGUE RIVER	APPLEGATE RIVER	APPCO2	COHO	CHENEY CR	MOUTH-EXTENT OF COHO HABITAT
ROGUE RIVER	APPLEGATE RIVER	APSTS1	SUMMER STEELHEAD	CHENEY CR	MOUTH-EXTENT OF STS HABITAT
ROGUE RIVER	APPLEGATE RIVER	APPCO3	COHO	WILLIAMS CR	POWELL CR-EXTENT OF COHO HABITAT
ROGUE RIVER	BIG BUTTE CREEK	URCHS2	SPRING CHINOOK	BIG BUTTE CR	MOUTH-MCNEIL CR
HUNTER CREEK	MAIN STEM	HCCHF1	FALL CHINOOK	HUNTER CR	HUNTER CR: 1.2 MI DOWNSTREAM FROM MOUTH OF CONN CR-L S FK
HUNTER CREEK	MAIN STEM	HCCHF2	FALL CHINOOK	HUNTER CR, LITTLE S FK	MOUTH-EXTENT OF CHF HABITAT
HUNTER CREEK	MAIN STEM	HCSTW1	WINTER STEELHEAD	HUNTER CR	MOUTH OF L S FK-NORTH FK

BASIN	SUBBASIN	ID CODE	SPECIES	STREAM REACH	LOCATION
PISTOL RIVER	MAIN STEM	PRCHF3	FALL CHINOOK	DEEP CR	DEEP CR: MOUTH-EXTENT OF CHF HABITAT
PISTOL RIVER	MAIN STEM	PRSTW1	WINTER STEELHEAD	PISTOL R	MOUTH OF DEEP CR-EXTENT OF STW HABITAT, INCLUDING TRIBS
PISTOL RIVER	MAIN STEM	PRCHF2	FALL CHINOOK	PISTOL R	S FORKK-N FORK
PISTOL RIVER	SOUTH FORK	PRCHF1	FALL CHINOOK	PISTOL R, S FK	S FK PISTOL R: MOUTH-SCOTT CR
CHETCO RIVER	MAIN STEM	CTCHF5	FALL CHINOOK	JACK CR	JACK CR: MOUTH-EXTENT OF CHF HABITAT
CHETCO RIVER	MAIN STEM	CTCHF3	FALL CHINOOK	EMILY CR	MOUTH-2ND TRIB FROM SOUTH
CHETCO RIVER	MAIN STEM	CTCHF4	FALL CHINOOK	CHETCO R	MOUTH OF BIG EMILY CR-EAGLE CR
CHETCO RIVER	NORTH FORK	CTCHF1	FALL CHINOOK	CHETCO R, N FK	MOUTH-EXTENT OF HABITAT
CHETCO RIVER	SOUTH FORK	CTCHF2	FALL CHINOOK	CHETCO R, S FK	MOUTH-RED MTN CR
WINCHUCK RIVER	MAIN STEM	WCCHF4	FALL CHINOOK	WINCHUCK R	DEER CR-WHEELER CR
WINCHUCK RIVER	MAIN STEM	WCCHF1	FALL CHINOOK	BEAR CR	MOUTH-EXTENT OF CHF HABITAT
WINCHUCK RIVER	MAIN STEM	WCCHF2	FALL CHINOOK	FOURTH OF JULY CR	MOUTH-EXTENT OF CHF HABITAT
WINCHUCK RIVER	MAIN STEM	WCCHF3	FALL CHINOOK	WHEELER CR	MOUTH-WILLOW CR

COASTAL SALMON RESTORATION INITIATIVE
Necanicum River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	22.2	23 %	13 %
CHUM SALMON	2.7	3 %	2 %
FALL CHINOOK SALMON	0.0	0 %	0 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	24.9	25 %	14 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 98.5

TOTAL BASIN RIVER MILES: 174.1

CORE SALMON AREAS

- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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LAND OWNERSHIP

- State Lands
- BLM Lands
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- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION

- Rivers
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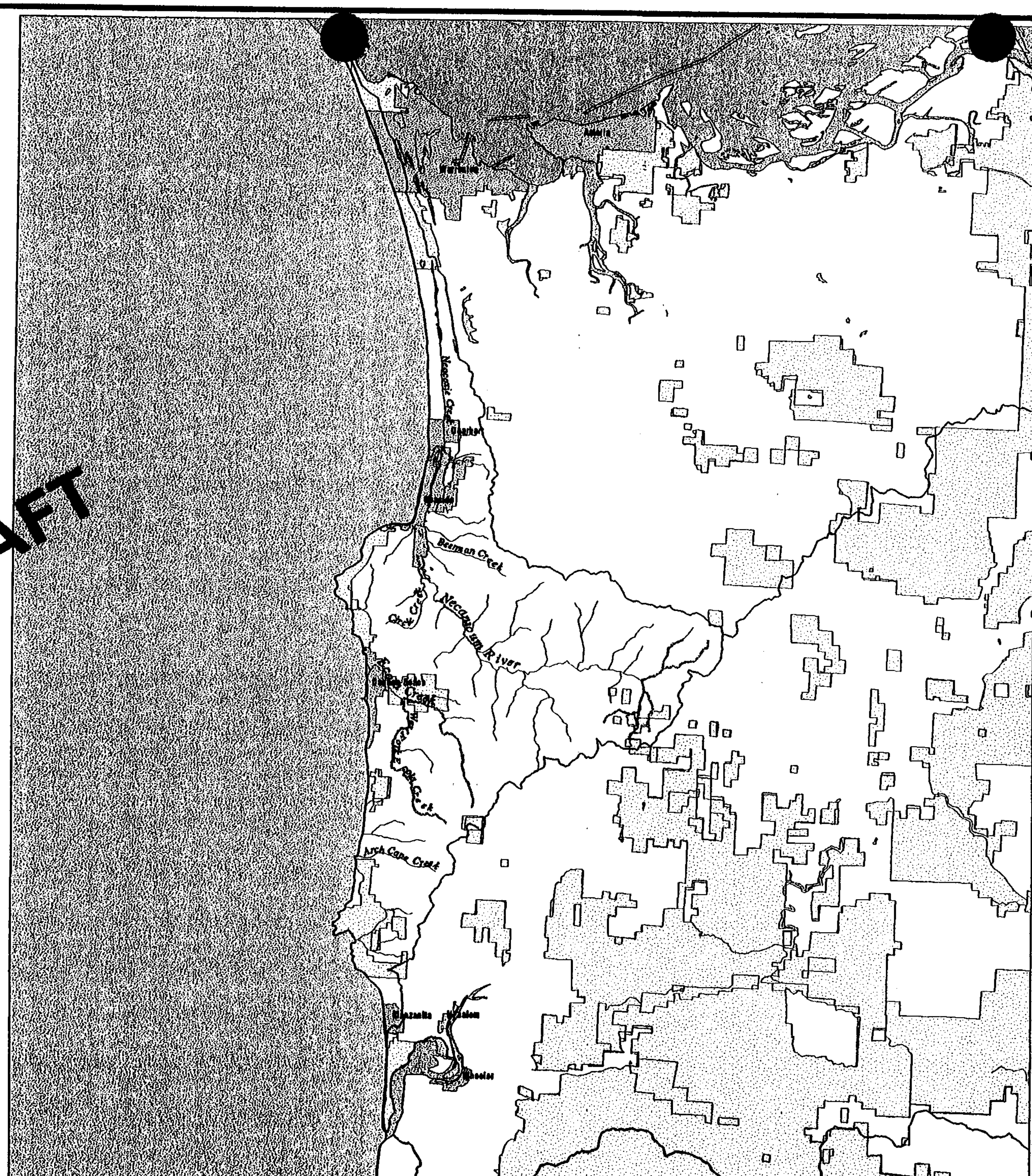
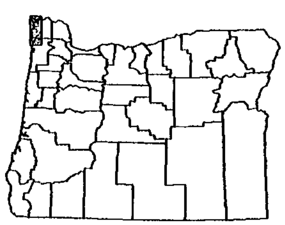
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Nehalem River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	PERCENT OF BASIN
COHO SALMON	108.3	17 %	12 %
CHUM SALMON	10.7	2 %	1 %
FALL CHINOOK SALMON	17.1	3 %	2 %
SPRING CHINOOK SALMON	37.8	6 %	4 %
WINTER STEELHEAD	81.7	13 %	9 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	213.3	33 %	23 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 635.2
TOTAL BASIN RIVER MILES: 935.2

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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LAND OWNERSHIP
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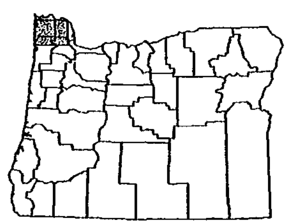

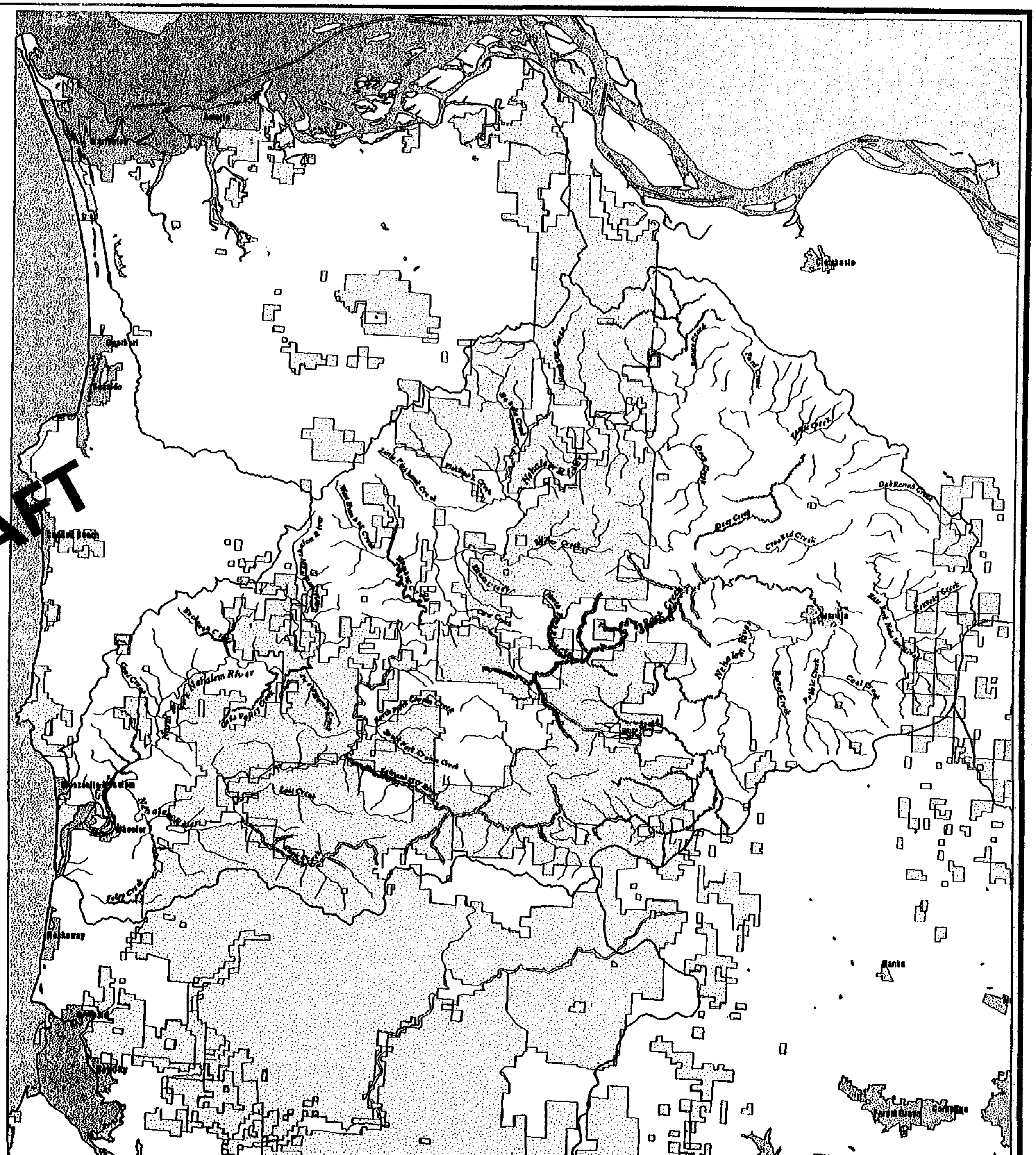

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Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Tillamook Bay Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	PERCENT OF BASIN
COHO SALMON	159.2	28 %	14 %
CHUM SALMON	35.2	6 %	3 %
FALL CHINOOK SALMON	50.6	9 %	4 %
SPRING CHINOOK SALMON	32.0	6 %	3 %
WINTER STEELHEAD	50.9	9 %	4 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	252.0	46 %	22 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 546.3
TOTAL BASIN RIVER MILES: 1132.3

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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LAND OWNERSHIP
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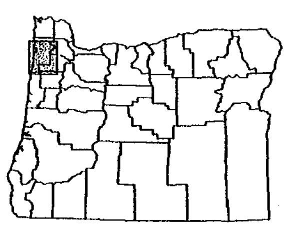

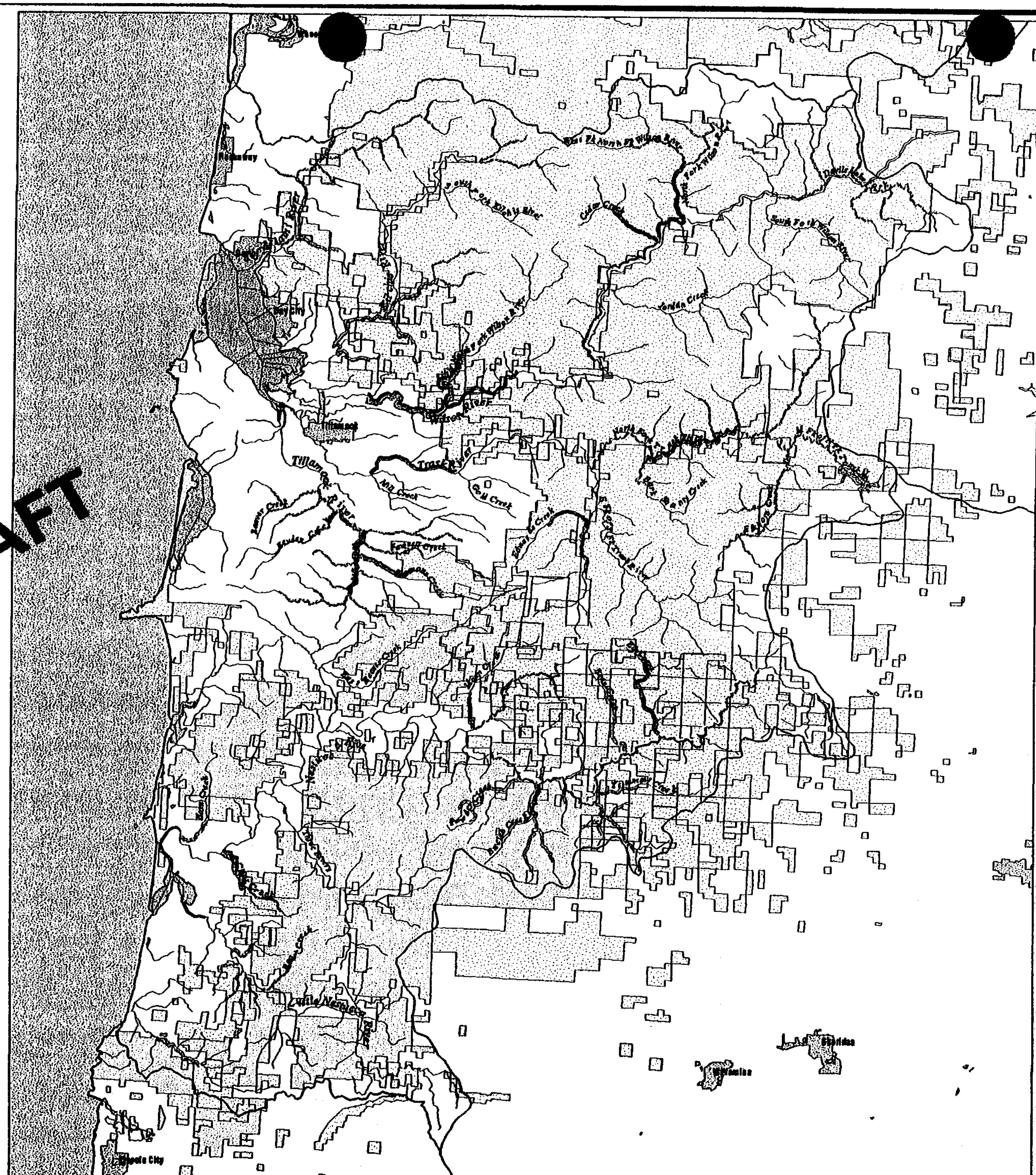

Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Siletz River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	PERCENT OF BASIN
COHO SALMON	110.2	19 %	10 %
CHUM SALMON	13.0	2 %	1 %
FALL CHINOOK SALMON	53.5	11 %	5 %
SPRING CHINOOK SALMON	7.5	1 %	0.7 %
WINTER STEELHEAD	49.4	9 %	4 %
SUMMER STEELHEAD	11.4	2 %	1 %
TOTAL CORE MILES	182.8	32 %	16 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 564.4
TOTAL BASIN RIVER MILES: 1129.7

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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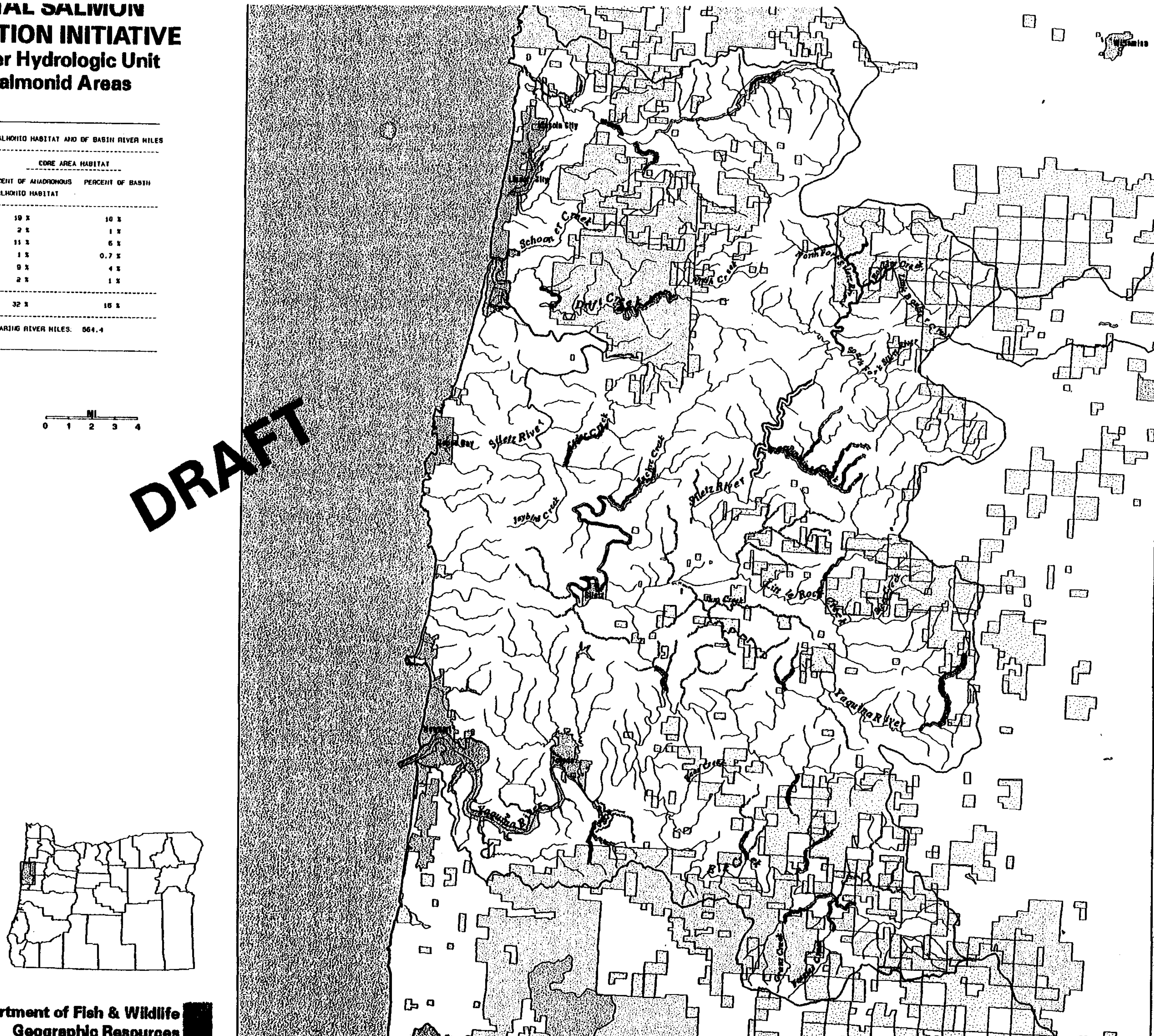

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Geographic Resources

C[...]STAL SALMON RESTORATION INITIATIVE
Alsea River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	117.7	22 %	14 %
CHUM SALMON	2.3	< 1 %	< 1 %
FALL CHINOOK SALMON	34.8	7 %	4 %
SPRING CHINOOK SALMON	16.0	3 %	2 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	148.1	28 %	18 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 533.5
TOTAL BASIN RIVER MILES: 834.3

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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- State Lands
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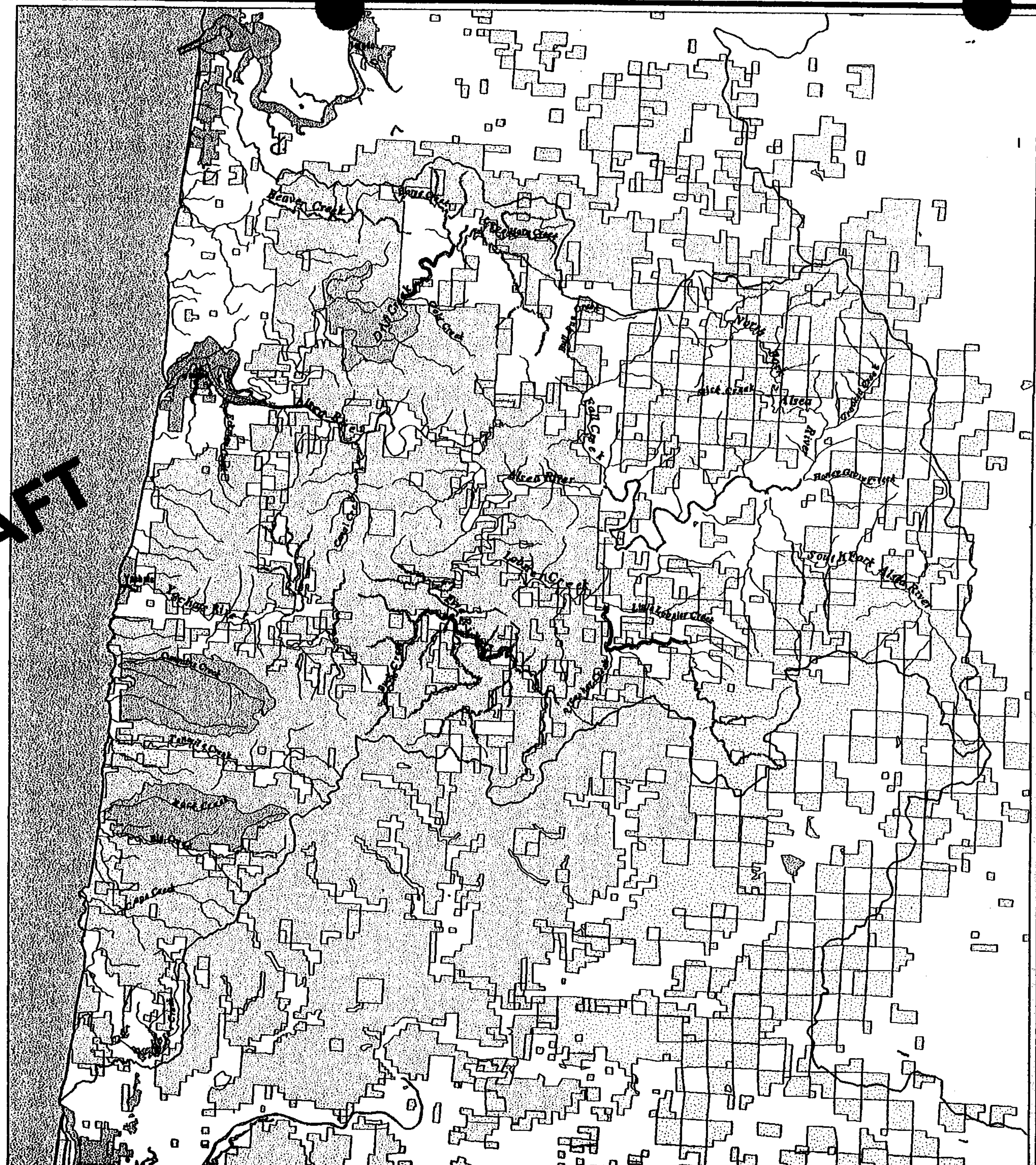

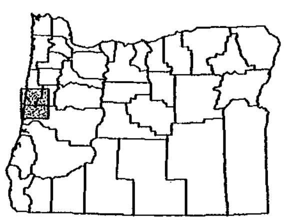

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COASTAL SALMON RESTORATION INITIATIVE
Siuslaw River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	199.0	28 %	22 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	94.1	13 %	10 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	50.0	7 %	5 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	281.2	39 %	31 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 716.2

TOTAL BASIN RIVER MILES: 914.4

CORE SALMON AREAS

- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

MI
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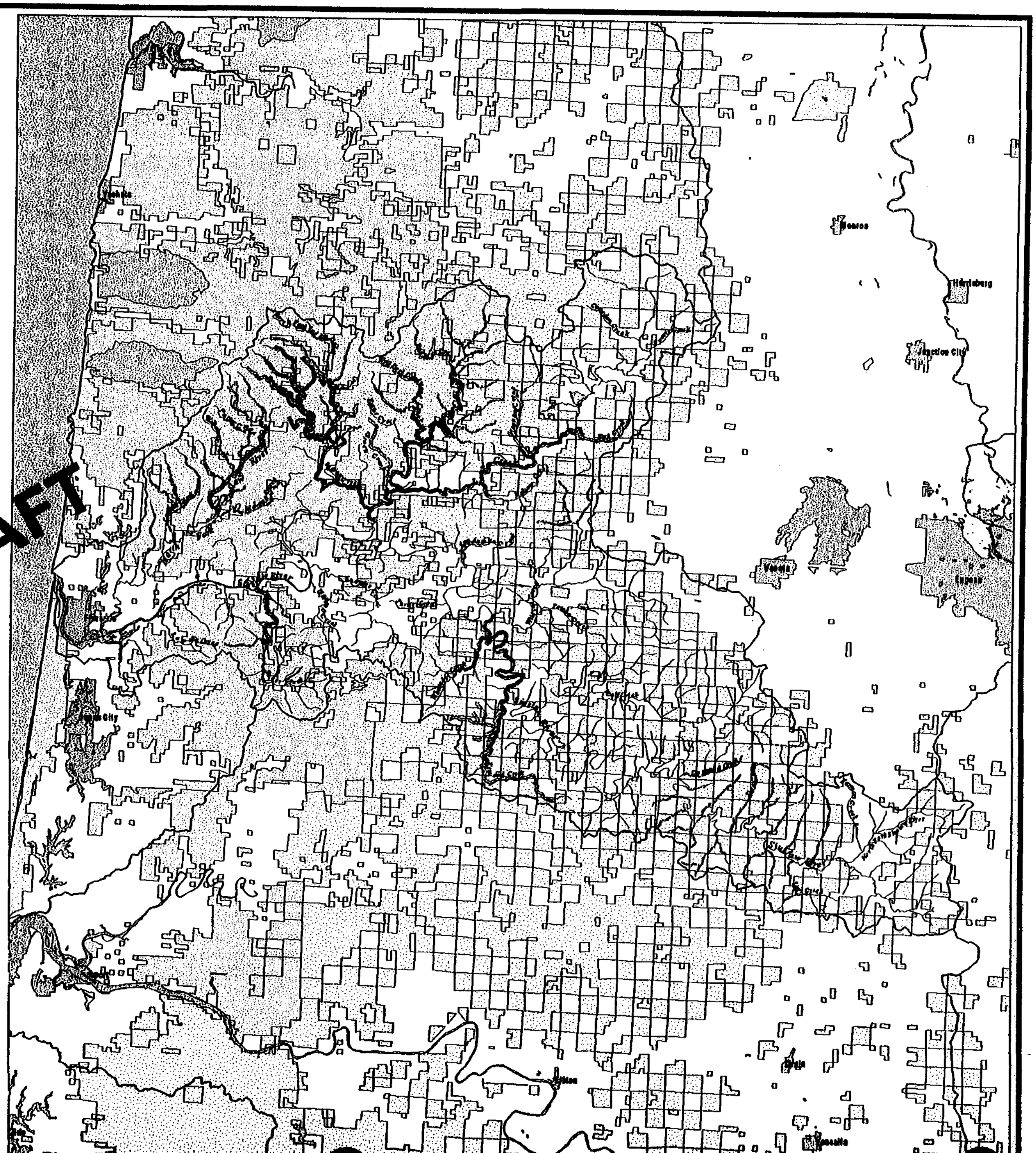
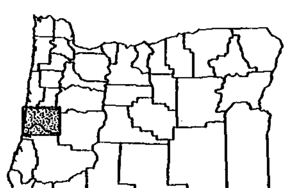
LAND OWNERSHIP

- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION

- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





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Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Siltcoos Lake Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	69.4	85 %	46 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	0.0	0 %	0 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	69.4	85 %	46 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 81.5
TOTAL BASIN RIVER MILES: 150.6

CORE SALMON AREAS

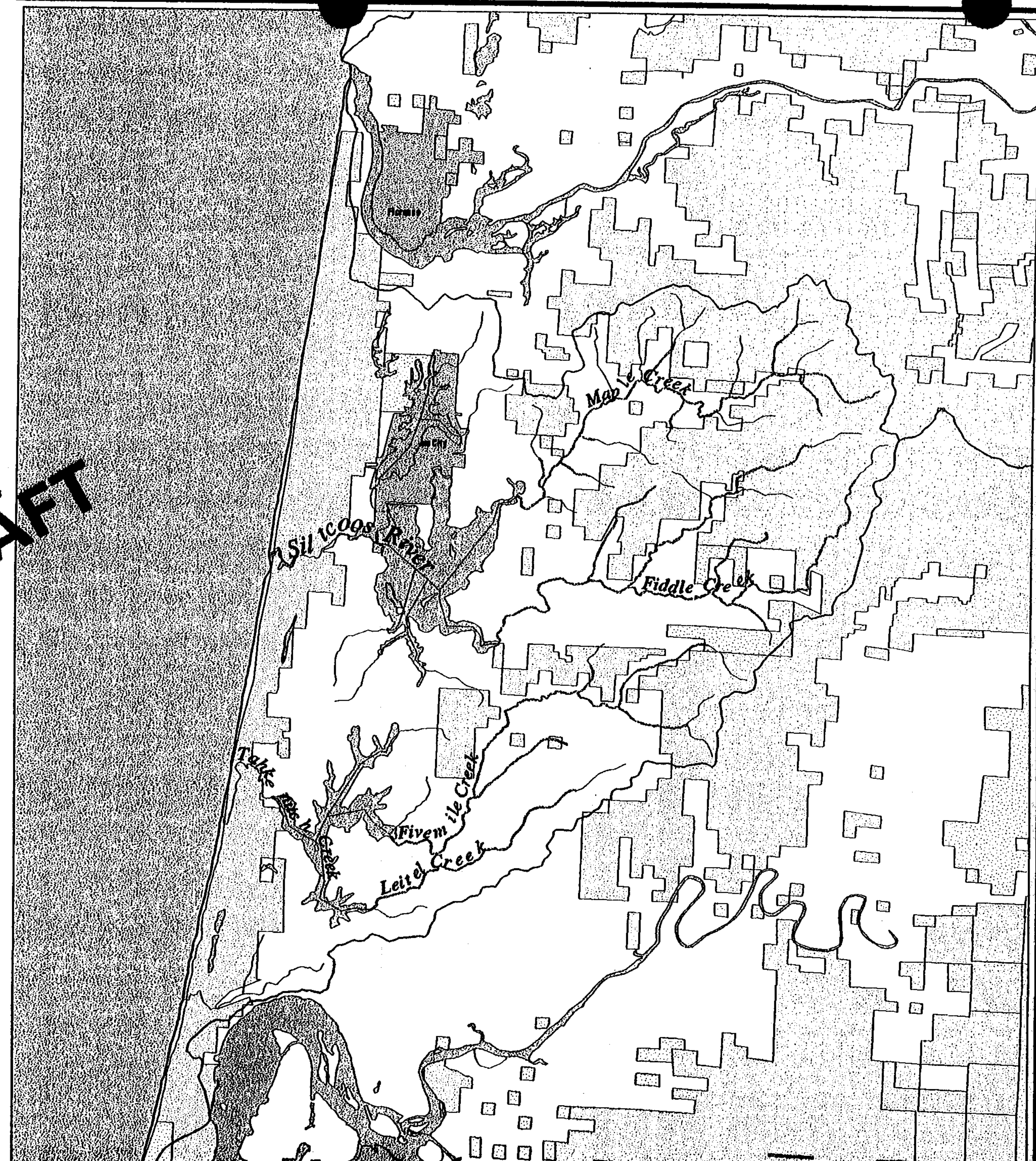
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

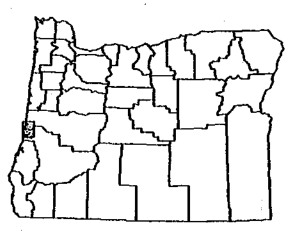
LAND OWNERSHIP

- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION

- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





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Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Lower Umpqua River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	195.8	19 %	12 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	39.6	4 %	2 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	200.1	20 %	12 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 1018.6
TOTAL BASIN RIVER MILES: 1697.1

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns

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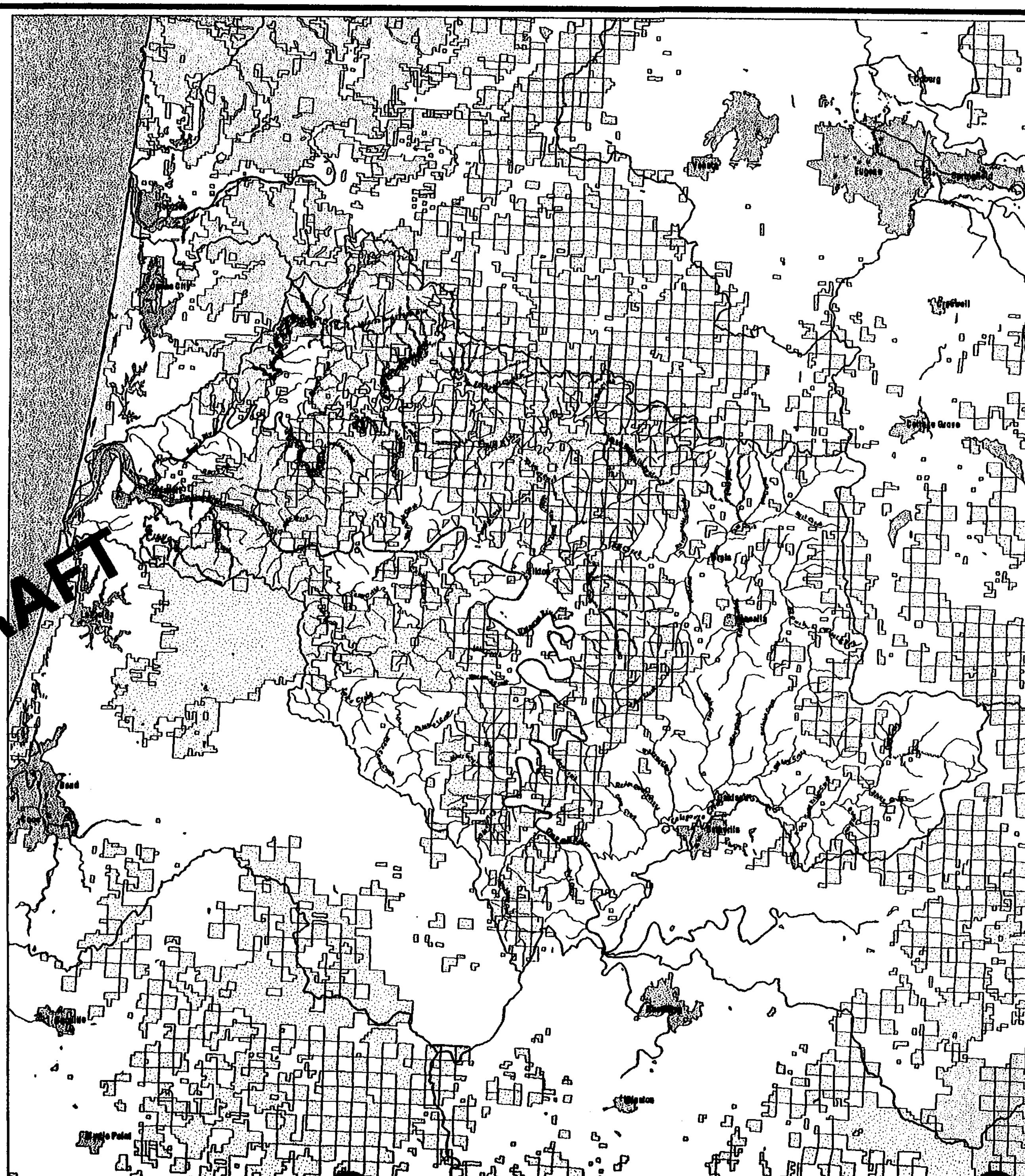

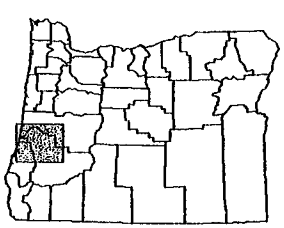

Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
North Umpqua River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	0.0	0 %	0 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	0.0	0 %	0 %
SPRING CHINOOK SALMON	47.6	15 %	3 %
WINTER STEELHEAD	41.2	13 %	3 %
SUMMER STEELHEAD	121.2	39 %	9 %
TOTAL CORE MILES	165.2	50 %	13 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 308.1
TOTAL BASIN RIVER MILES: 1381.5

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

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- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns

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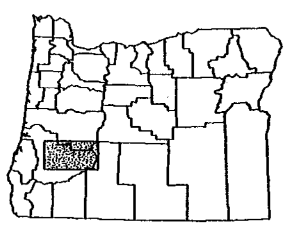

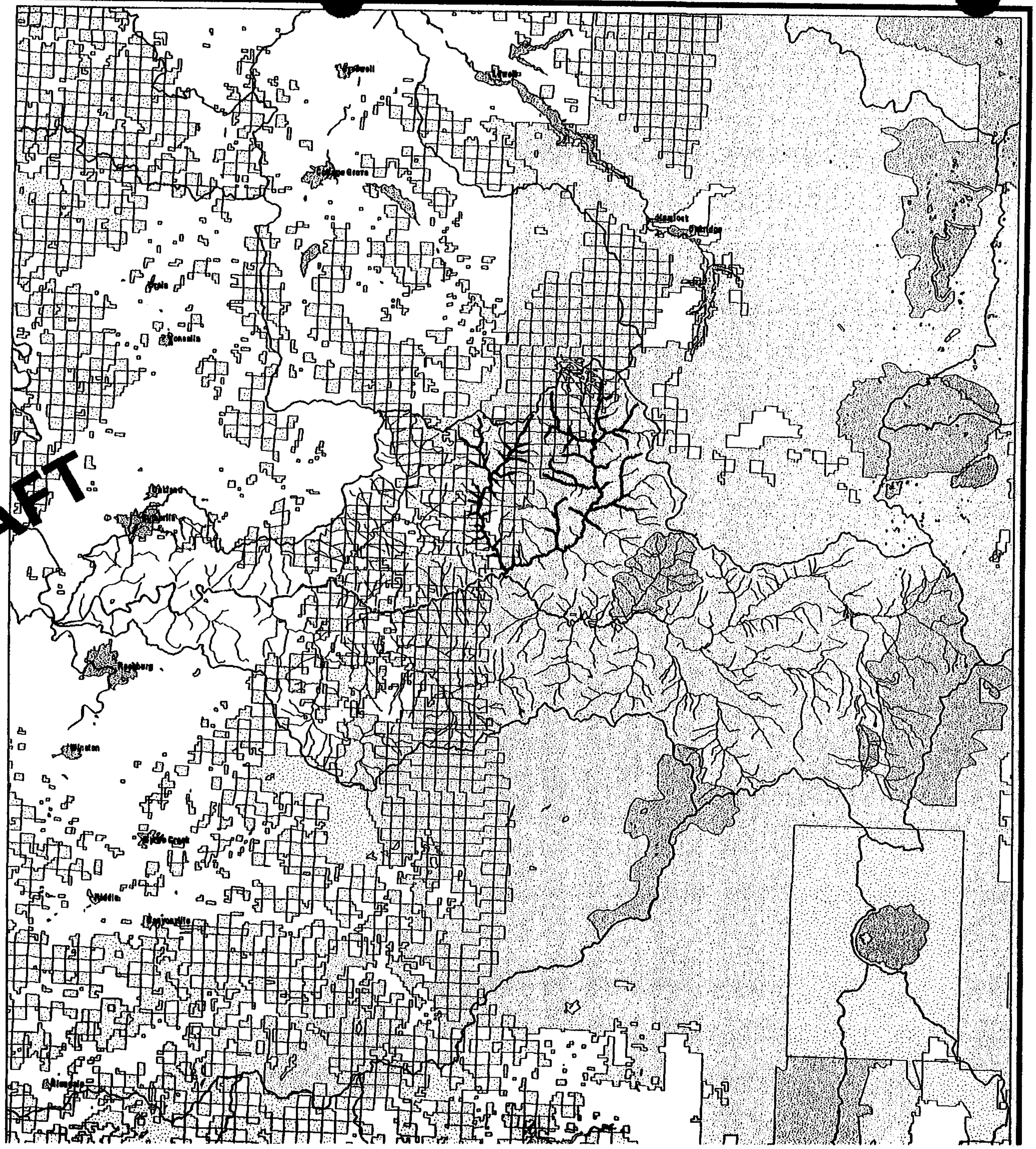

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Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
South Umpqua River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	69.3	8 %	4 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	72.9	9 %	4 %
SPRING CHINOOK SALMON	47.5	6 %	2 %
WINTER STEELHEAD	285.1	35 %	15 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	428.3	52 %	22 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 820.1
TOTAL BASIN RIVER MILES: 1916.4

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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0 1 2 3 4

LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

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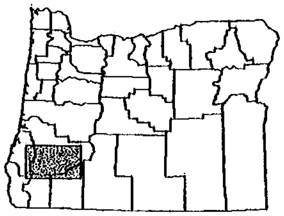
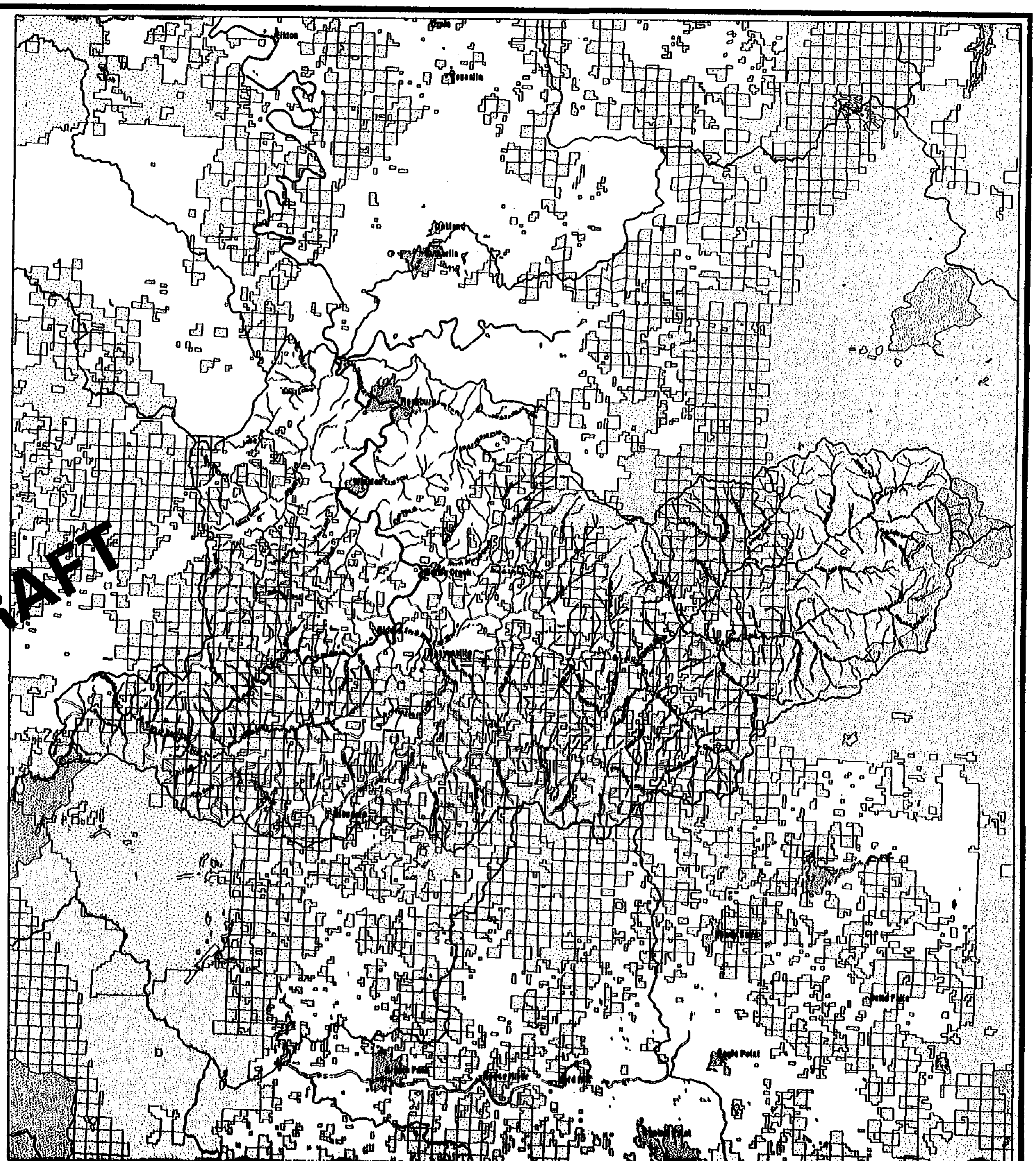
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Coos Bay Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	164.1	31 %	18 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	43.9	8 %	5 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	87.8	17 %	9 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	185.8	35 %	20 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 521.8
TOTAL BASIN RIVER MILES: 936.5

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
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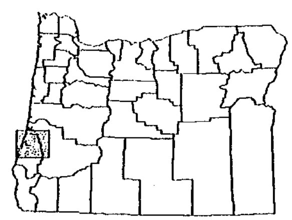
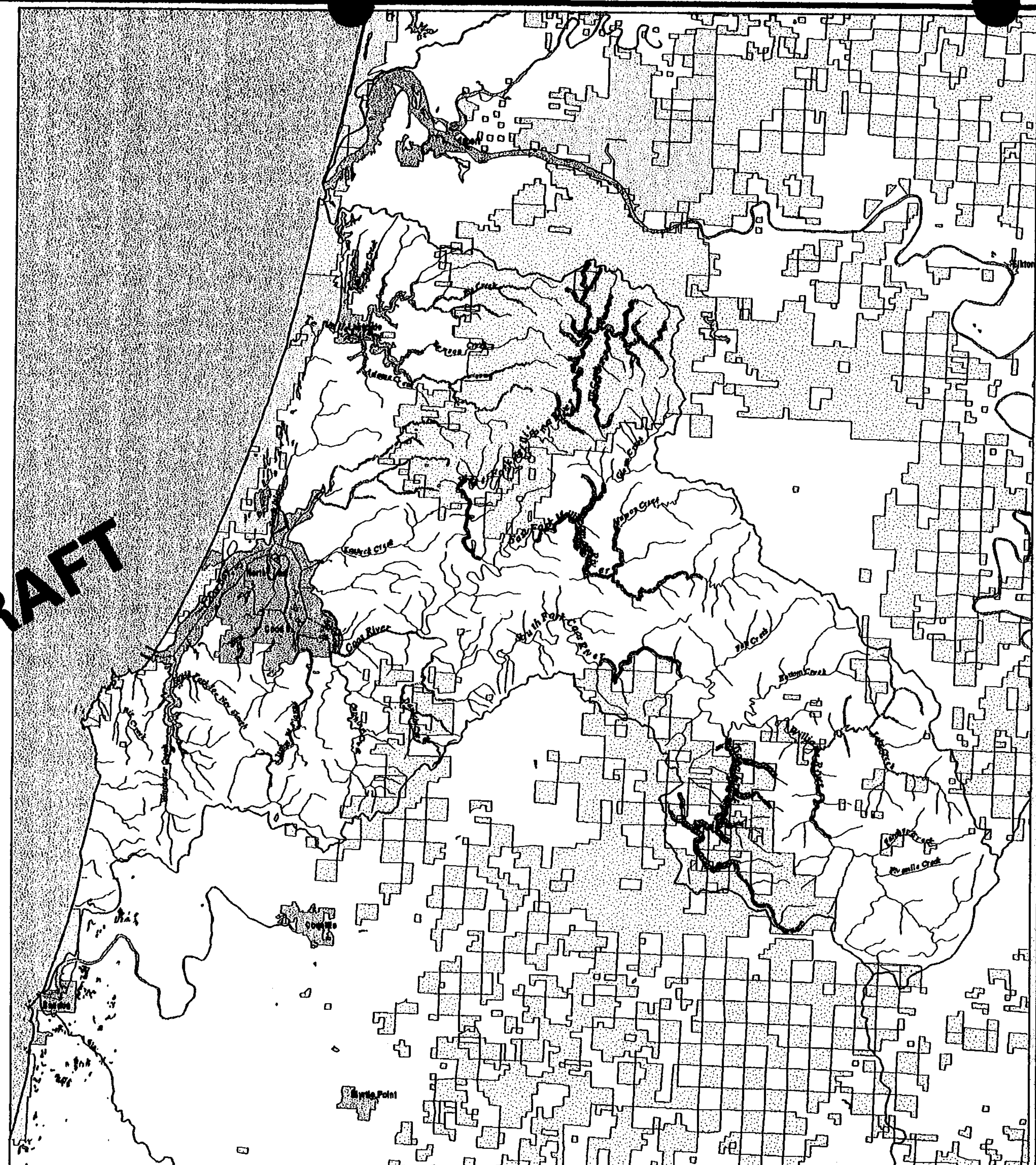
- Cities & Towns





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Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Coquille River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	125.8	26 %	10 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	80.7	17 %	7 %
SPRING CHINOOK SALMON	25.0	5 %	2 %
WINTER STEELHEAD	65.4	14 %	5 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	211.5	44 %	17 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 485.6

TOTAL BASIN RIVER MILES: 1216.1

CORE SALMON AREAS

- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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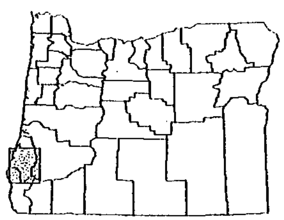
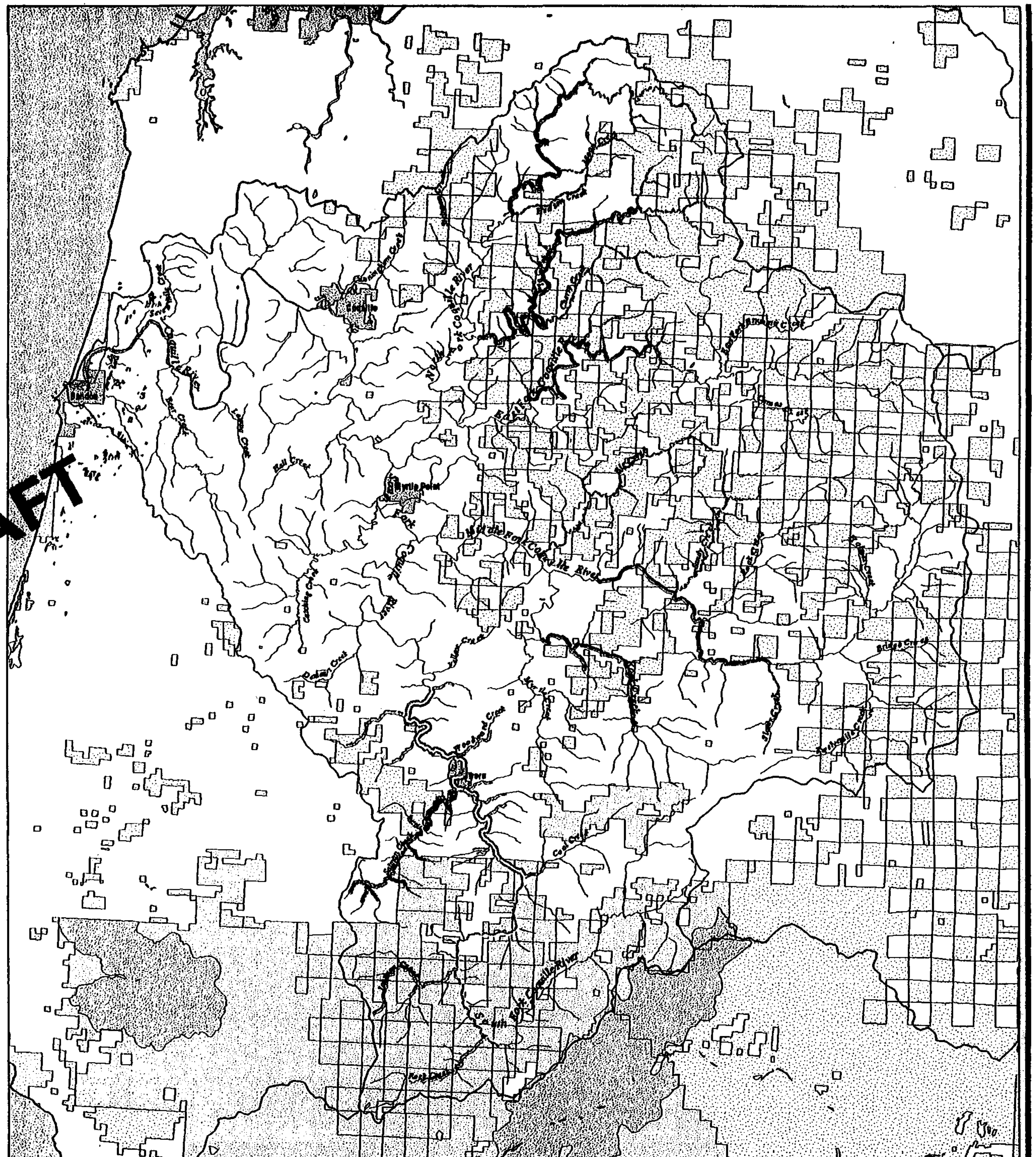
LAND OWNERSHIP

- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION

- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Sixes River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	47.4	29 %	10 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	44.1	27 %	9 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	29.2	18 %	6 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	100.6	62 %	21 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 162.5
TOTAL BASIN RIVER MILES: 480.5

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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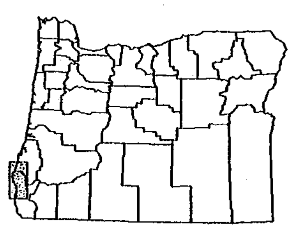
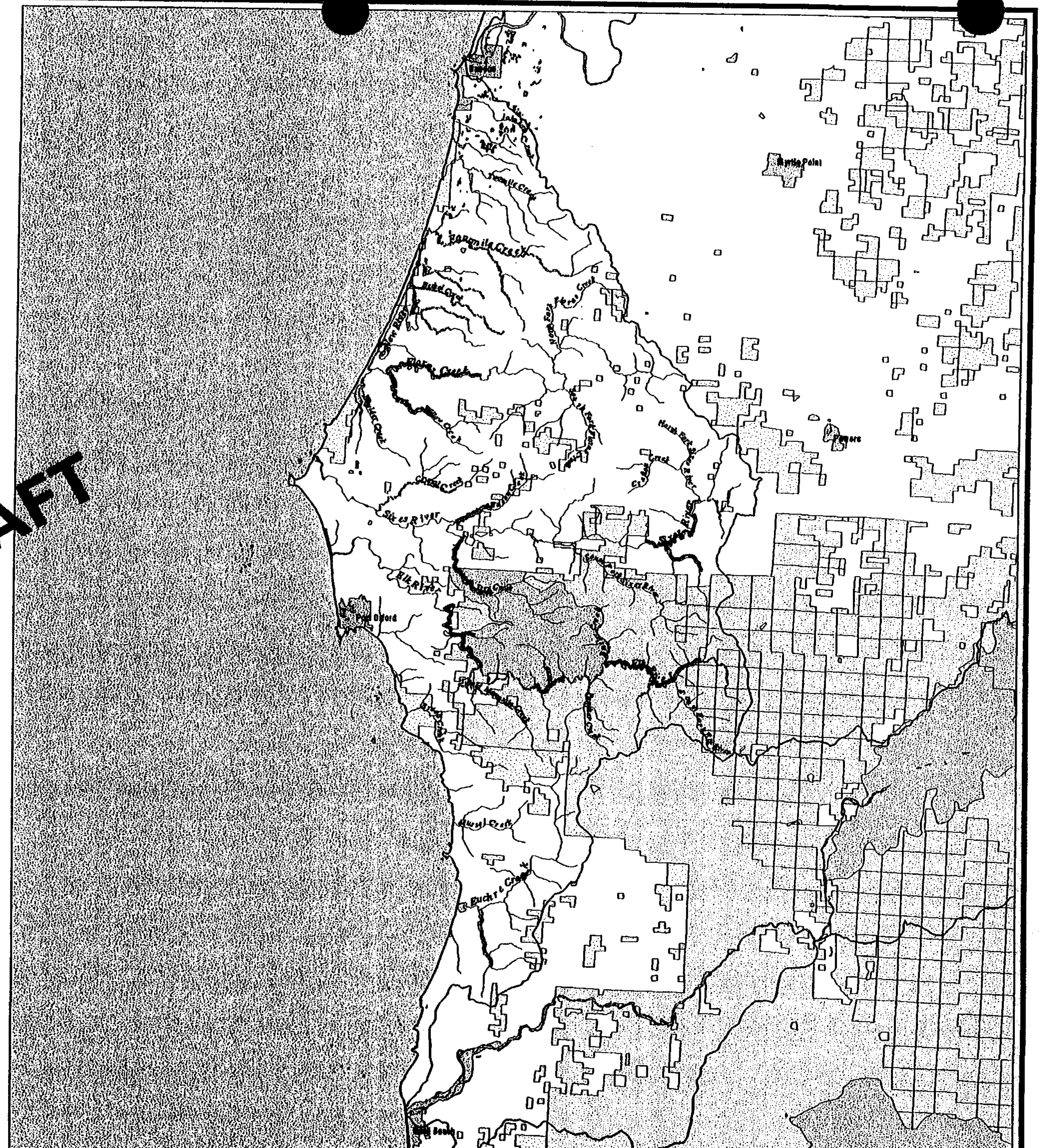
LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Lower Rogue River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	19.1	8 %	2 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	32.2	14 %	4 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	45.0	19 %	5 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 238.4
TOTAL BASIN RIVER MILES: 905.4

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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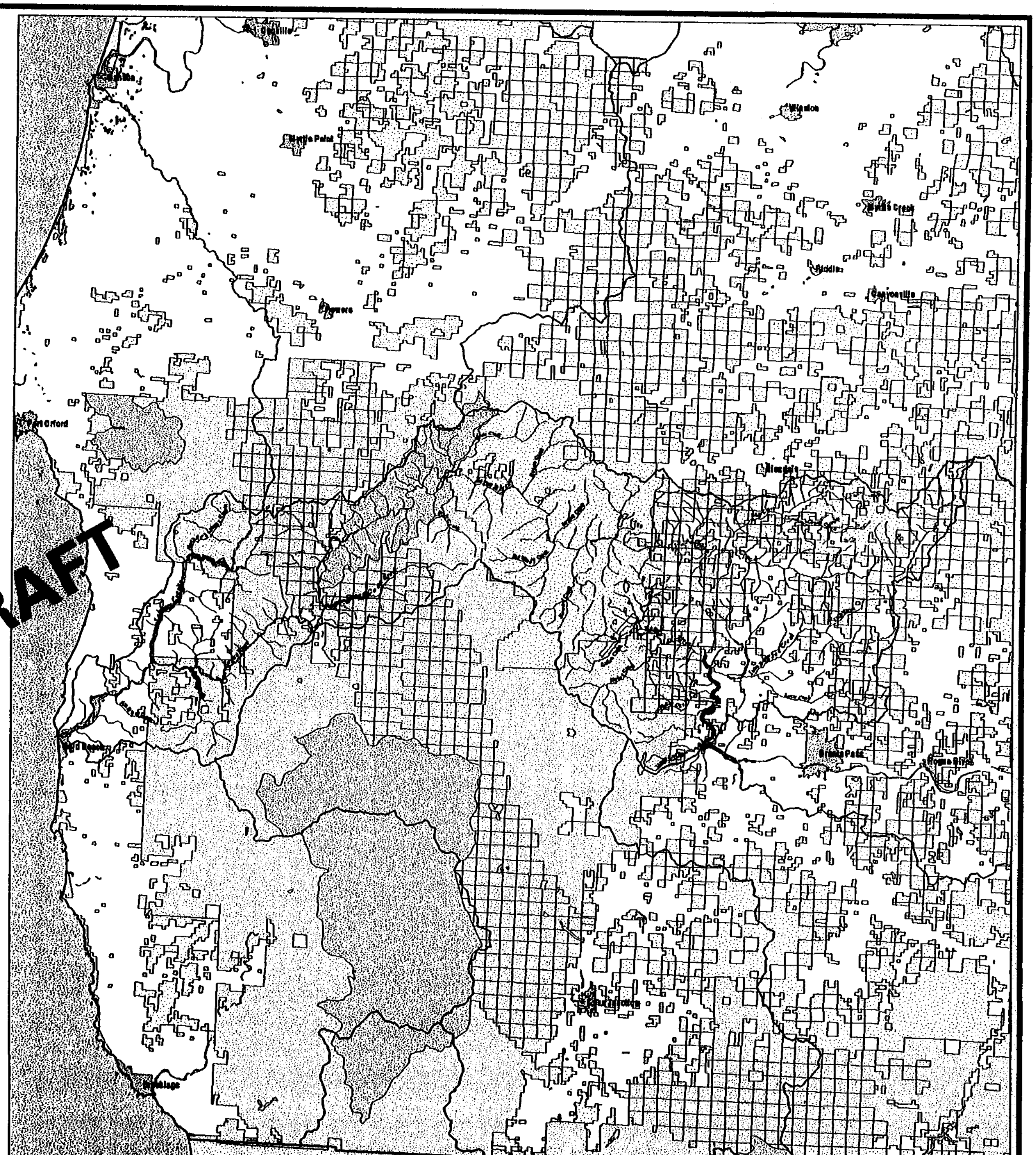
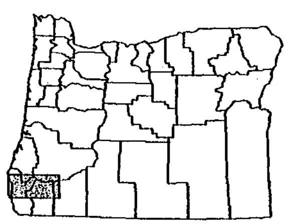
LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Chetco River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	0.0	0 %	0 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	60.6	22 %	10 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	39.2	14 %	6 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	92.8	34 %	15 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 276.0

TOTAL BASIN RIVER MILES: 632.6

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns

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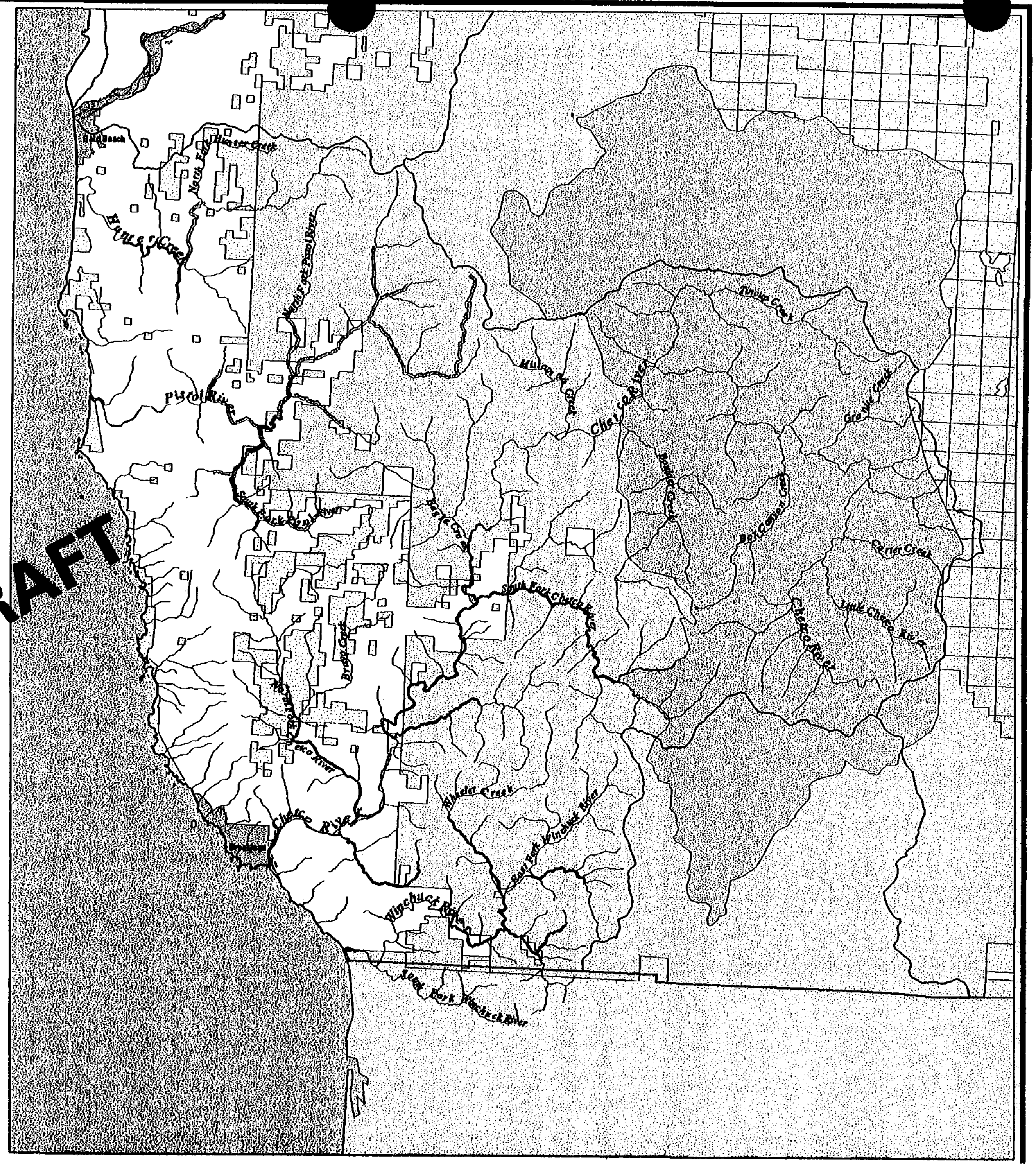

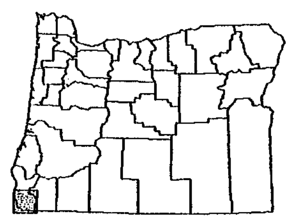

Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Upper Rogue River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	PERCENT OF BASIN
COHO SALMON	41.4	31 %	3 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	0.0	0 %	0 %
SPRING CHINOOK SALMON	27.1	20 %	2 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	19.3	14 %	1 %
TOTAL CORE MILES	87.8	65 %	5 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 134.1
TOTAL BASIN RIVER MILES: 1624.4

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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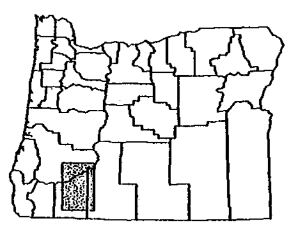
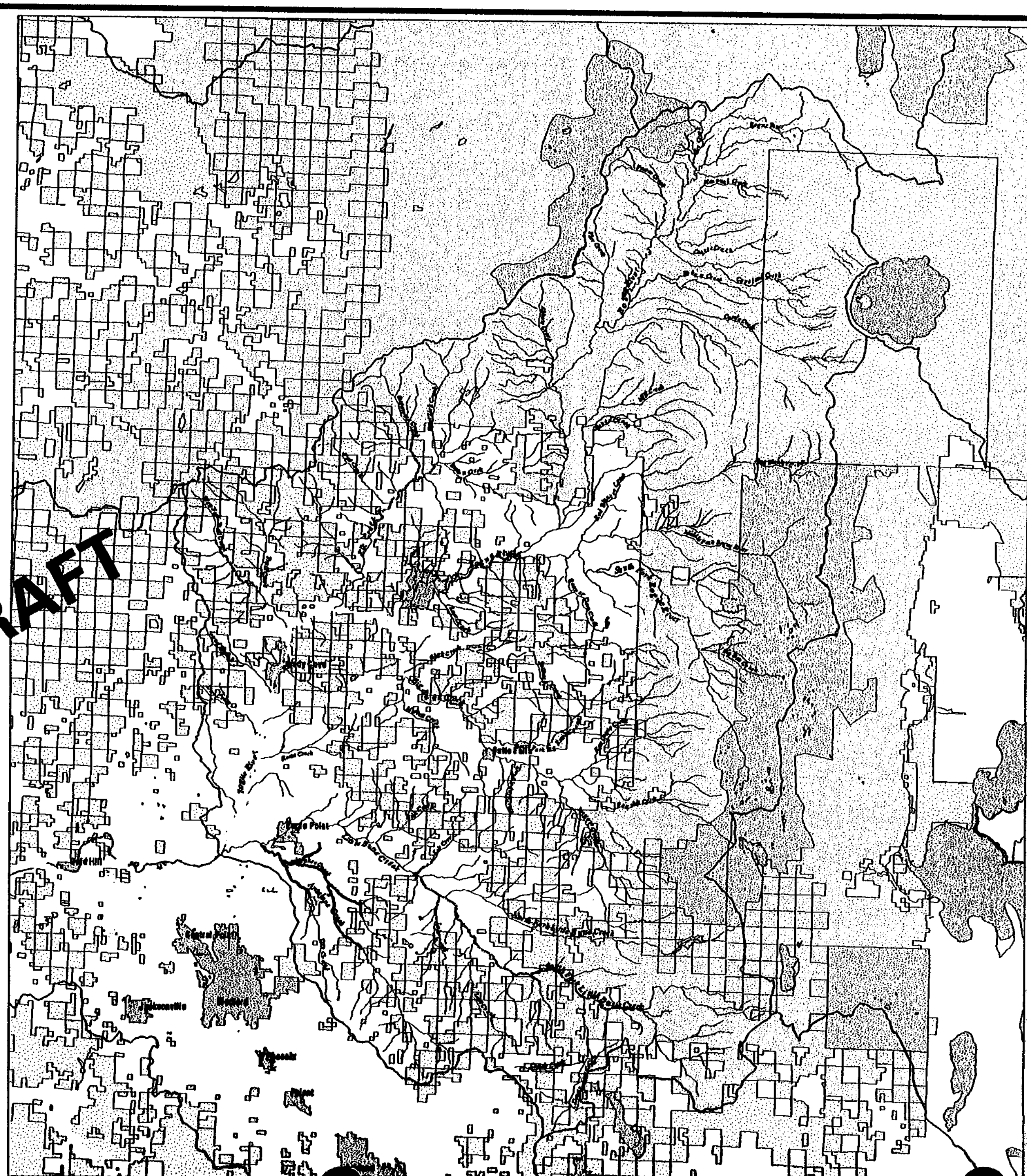
LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Middle Rogue River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	28.8	19 %	3 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	31.9	22 %	4 %
SPRING CHINOOK SALMON	5.5	4 %	1 %
WINTER STEELHEAD	26.8	19 %	3 %
SUMMER STEELHEAD	19.3	13 %	2 %
TOTAL CORE MILES	78.0	54 %	9 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES. 144.1
TOTAL BASIN RIVER MILES: 859.1

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

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LAND OWNERSHIP
- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION
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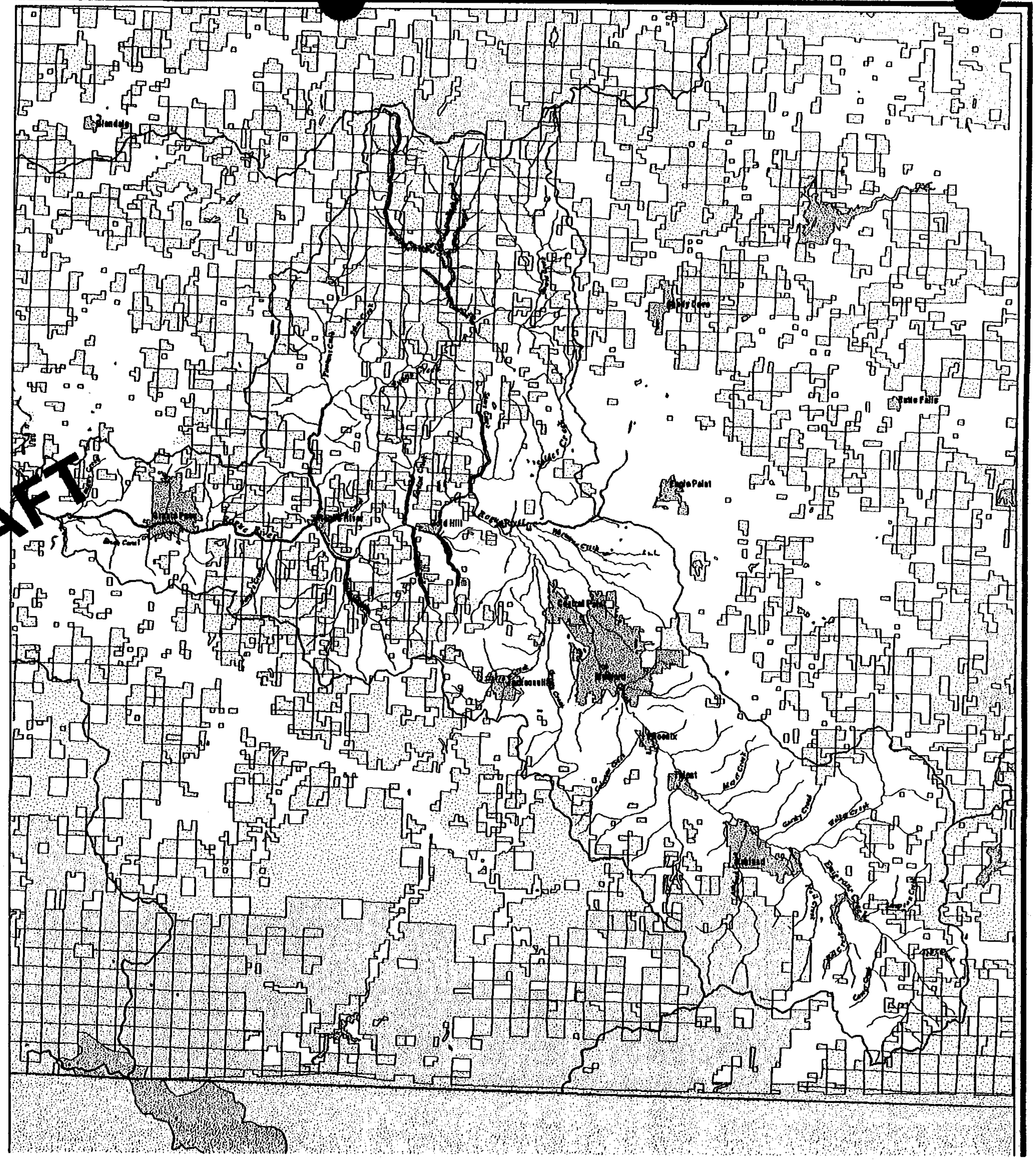
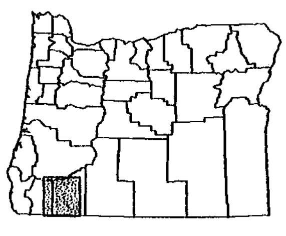
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Applegate River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	13.5	11 %	2 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	29.5	23 %	4 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	4.2	3 %	1 %
TOTAL CORE MILES	43.0	34 %	5 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 127.9
TOTAL BASIN RIVER MILES: 830.1

CORE SALMON AREAS
- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

LAND OWNERSHIP
- State Lands
- BLM Lands
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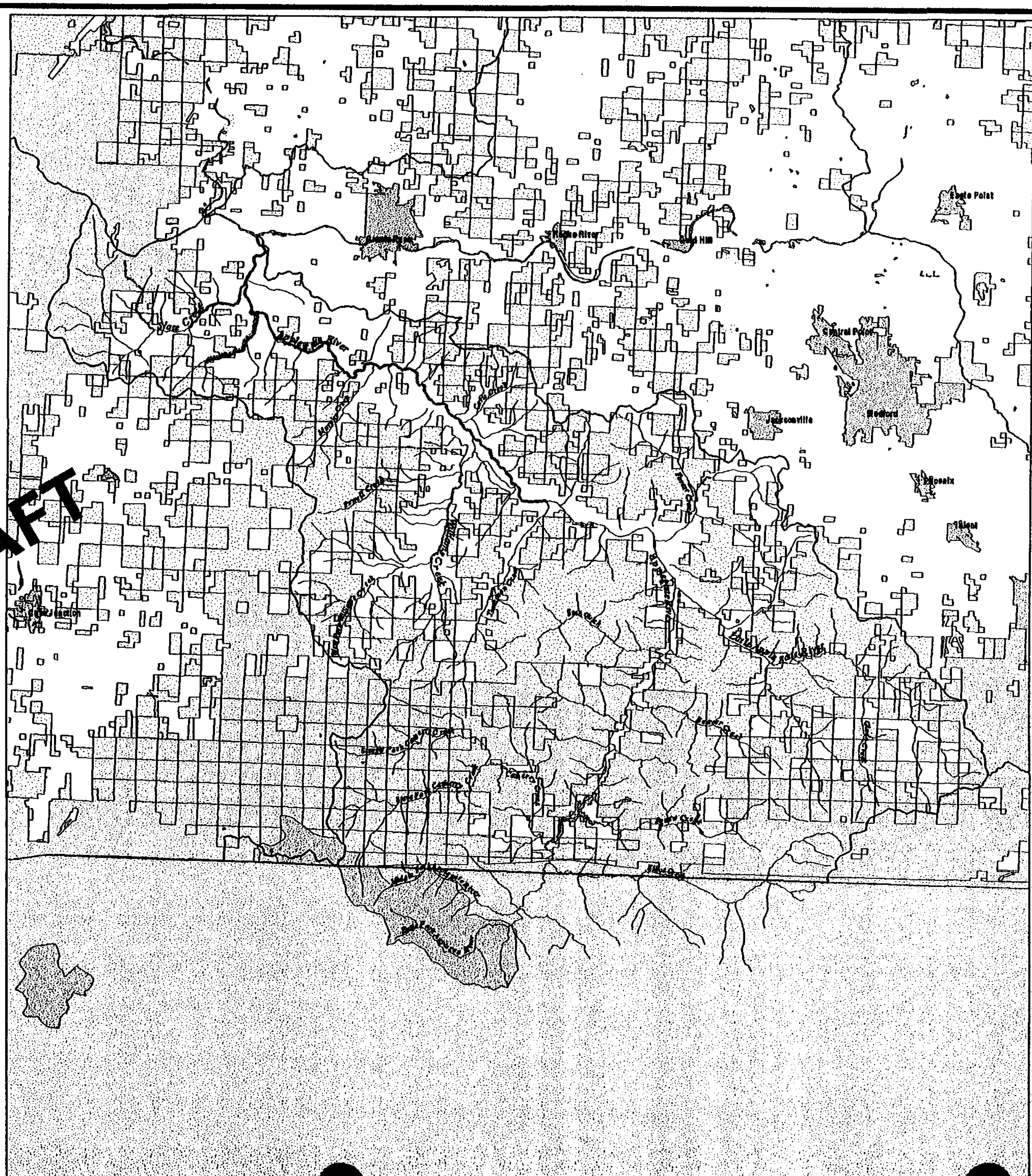
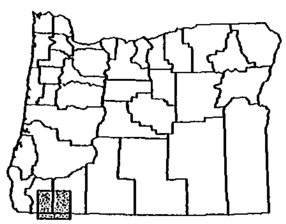




Oregon Department of Fish & Wildlife
Geographic Resources

COASTAL SALMON RESTORATION INITIATIVE
Illinois River Hydrologic Unit
Core Salmonid Areas

CORE AREAS AS PERCENT OF ANADROMOUS SALMONID HABITAT AND OF BASIN RIVER MILES

SPECIES/RACE	CORE MILES	CORE AREA HABITAT: PERCENT OF ANADROMOUS SALMONID HABITAT	CORE AREA HABITAT: PERCENT OF BASIN
COHO SALMON	34.9	14 %	3 %
CHUM SALMON	0.0	0 %	0 %
FALL CHINOOK SALMON	29.9	12 %	3 %
SPRING CHINOOK SALMON	0.0	0 %	0 %
WINTER STEELHEAD	0.0	0 %	0 %
SUMMER STEELHEAD	0.0	0 %	0 %
TOTAL CORE MILES	64.8	26 %	6 %

TOTAL ANADROMOUS SALMONID SPAWNING & REARING RIVER MILES: 254.7

TOTAL BASIN RIVER MILES: 1039.5

CORE SALMON AREAS

- Coho
- Chum
- Winter Steelhead
- Summer Steelhead
- Fall Chinook
- Spring Chinook

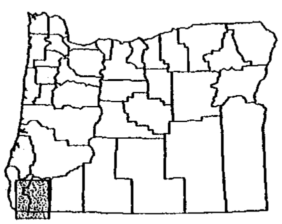
MI
0 1 2 3 4

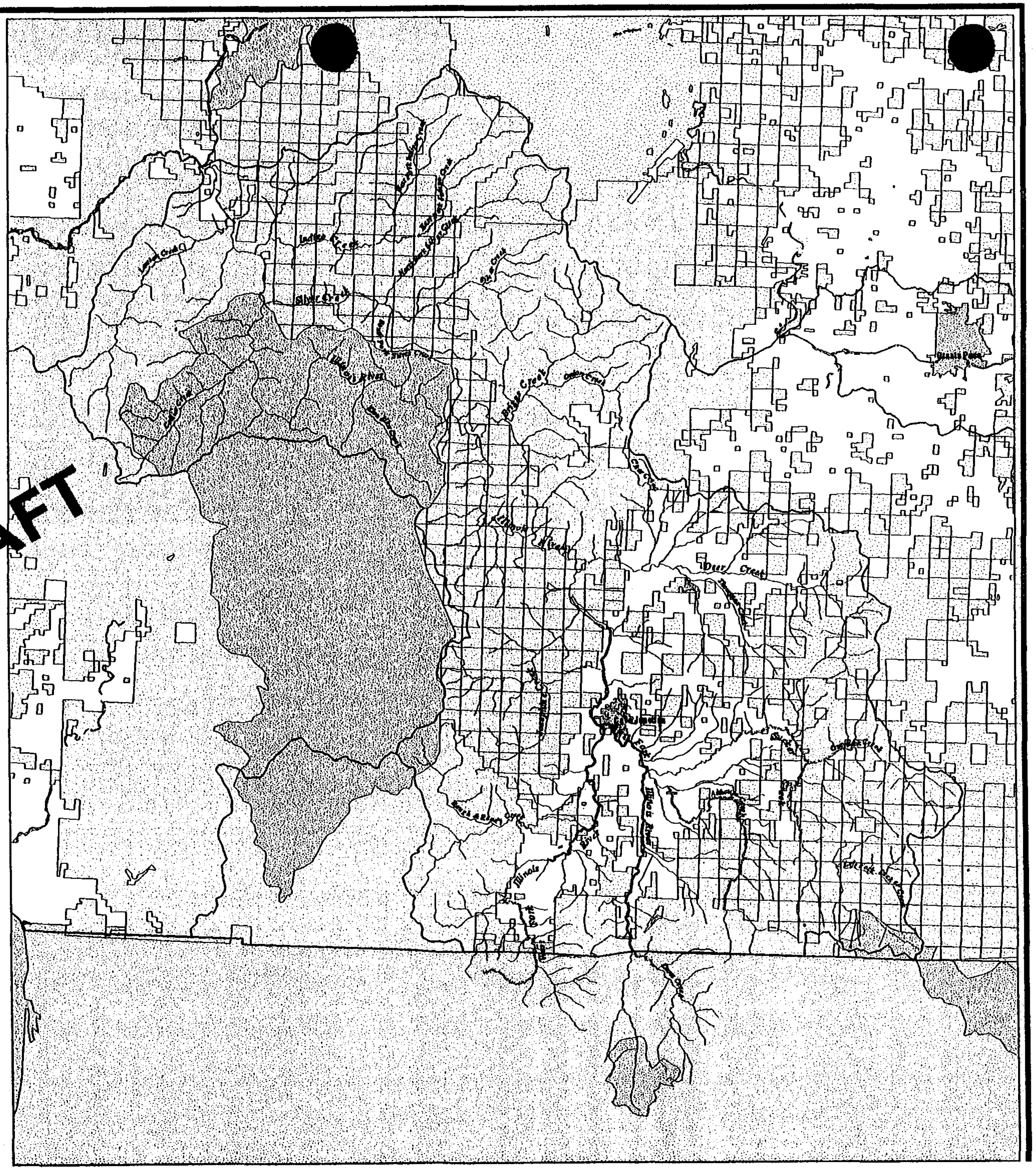
LAND OWNERSHIP

- State Lands
- BLM Lands
- USFS Lands
- Wilderness Areas (USFS)
- Other Federal Lands

OTHER INFORMATION

- Rivers
- Lakes, Reservoirs, Bays, Tidal Areas
- Cities & Towns





Oregon Department of Fish & Wildlife
Geographic Resources