

Oregon Watershed Enhancement Board

Research Priorities – March 2002 revised June 2006

I. Highest Priority Information Needs for the Oregon Plan

- 1. Assess the status of watershed health as indicated by anadromous salmonid stocks (coho, chinook, and chum salmon, sea-run cutthroat trout, and steelhead), and the risk for their extinction by integrating dynamic ocean conditions, habitat availability and quality, and human activities.**

The IMST has identified the importance of adopting a landscape context for the Oregon Plan, and the need for long-term perspectives that incorporate changing conditions in terrestrial, freshwater, and ocean ecosystems. The IMST identified several components needed to support these overall research goals. These include:

- Research that aids understanding of interactions among basin populations, metapopulations, ocean survival rates, life history stage (survival) trends, and population viability.
- Analysis and integration of information from habitat assessments and salmon spawner or juvenile surveys with models that assess salmon population trends and population dynamics and to conduct sensitivity analysis of models and model parameters.
- Research that compares distribution of spawner abundance relative to spawning habitat of differing quality.
- Evaluation of the ability of current monitoring and research programs to provide data required for life-cycle modeling and to measure the following: 1) recolonization of habitats as stocks recover, 2) straying rates, 3) distribution of spawners across their ranges, 4) degree of unoccupied habitats, and 5) variable effects of ocean survival rates within and among Gene Conservation Groups.
- Strengthen life-cycle modeling concepts and apply them to broader ranges of land use and management questions.
- Research that identifies the relationships between landscape dynamics and aquatic resources and their habitats.

II. High Priority Information Needs for the Oregon Plan

A. Related to Watershed Conditions

- 1. Determine how changes in land use and land cover, including riparian and upland vegetation, can affect salmonid habitat quality.**

Remote sensing and ground surveys are needed to establish baseline data and to compare them to historical records in order to conduct trend assessments of watershed

and habitat conditions. Currently, remote sensing has not been used to its fullest potential under the Oregon Plan. Determine the accuracy of various remotely sensed data and the proper scales at which they should be used.

2. Determine relationships between population trends of fish and wildlife and land use/land cover changes.

Research is needed to estimate: 1) the past abundance and distribution of salmon throughout the landscape, 2) the changes in abundance and distribution through time, and 3) the changes in habitat type and availability that have occurred as estuaries, rivers, and streams have been modified to accommodate a variety of human activities.

B. Specifically Related to Fishery Management

1. Determine the effects of wild-hatchery fish interactions and the impacts of hatchery management programs on wild stocks. Test the assumptions about survival differences between hatchery and wild fish.

Few studies have tracked the effects of interactions between hatchery and wild fish on the long-term persistence of wild populations. Future research should include both genetic analysis and ecological analysis of the effects of competition.

2. Determine the origin and the temporal and spatial distribution of wild ocean-caught fish.

Research is needed to determine which freshwater populations are altered by ocean harvest, and when, where, and how many fish are encountered. Harvest management decisions and policies will not be effective for protecting critically low populations without this information.

3. Determine the spawning escapement rate of steelhead.

There are comparatively few steelhead survival data due to difficulties in monitoring both juvenile migrants and adult returns. Little is known about both freshwater and marine survival of steelhead. There is a need for increased emphasis on monitoring the spawning escapement of steelhead to obtain better estimates of survival and abundance.

4. Determine the genetic basis of various life history strategies in salmonids.

Environmental and genetic controls of life-history paths need to be determined so genetic life history stages can be preserved on both the population and metapopulation levels. The diversity in migration times, spawning times, and unique life history paths (e.g. residual fish and precocial males) should be preserved to maintain a population's resiliency.

III. Moderate Priority Information Needs for the Oregon Plan

1. Determine the impacts of declining wild salmonid populations on ecosystem processes.

Examples of research needs include, but are not limited to:

- Determining the response of juvenile salmonids and their food webs to carcass abundance and how many spawners are needed to support the next generation of developing salmonids. Experiments are needed to establish this relationship and to determine the processes involved. This is crucial when available carcass numbers are low.
- Determining the effects of hatchery releases on the same and other species. Ecosystem attributes to consider include stream and ocean carrying capacity, biodiversity, life history diversity, the effects of inter- and intra-specific competition, diseases, and ocean trends and climate conditions.

2. Determine the effects of predation on salmonid recovery and how predation interacts with other environmental factors.

A holistic approach is required to evaluate predation in comparison with other causes of population declines and to effectively undertake management actions. The information required for this purpose is not currently available.

IV. Low Priority Information Needs for the Oregon Plan

1. Determine the impacts of non-indigenous (exotic) aquatic and terrestrial species on salmonid recovery.

The extent of deleterious effects from non-native species on salmonids and their recovery and the overall effect of non-native species on the health of natural ecosystems in the state are not known.

2. Determine the cause and effects of disease, tumors, and other abnormalities of fish on the population dynamics of the fish and the implications for ecosystem and human health.

The extent and consequences of an increase in the incidences of diseases, tumors, and physical abnormalities and their epidemiology is not fully known but may have the potential to prevent some salmonid stocks from fully recovering.