DISCUSSION PAPER FOR

HYDROPOWER ASSESSMENT STEERING COMMITTEE

INTRODUCTION

The Northwest Power Planning Council has embarked upon a process of ranking potential hydropower sites based on their value to fish and wildlife and their hydropower potential. The goal of such ranking to guide future hydropower development in a manner that provides for protection, mitigation and enhancement of fish and wildlife. This guidance will also allow for a more accurate assessment of realistic hydropower potential in the region for use in energy planning.

To accomplish the ranking based on fish and wildlife concerns, two types of methodologies are required to be developed; these are critical habitat and accumulative effects. The direction for developing these two methods is provided in Section 1204(b) and (c) of the Council's Columbia River Basin Fish and Wildlife Program. The Bonneville Power Administration (BPA) is to fund the developemnt of these methods for use by the Council in its site ranking process.

In implementation of its responsibilities to fund these two studies, BPA must develop work statements to direct methodology development. These work statements will be developed in concert with the Council for its approval prior to funding. The views of the steering committee will be useful in this process. The remainder of this paper is provided as an initial catalyst of discussion by the committee.

CRITICAL HABITAT

In pursuing the development of a method or methods for classifying streams based on critical habitat, a definition of critical habitat must first be determined as a basis from which to build a methodology. A range of definitions of critical habitat have been reviewed. This range includes from one extreme, the meaning specified in 7(a)(2) of the Endangered Species Act to a definition of all habitat essential to a species life cycle regardless of numbers or conditions of the population. Within this range a definition, at least for anadromous fish, could be that habitat essential to meet future goals set by the Council. This range for definition of critical habitat should encompass that necessary upon which to base a method(s) for use by the Council. The methodology(ies) will be based on existing data with no new data required to implement the method.

1. Endangered Species Act

The Act provides for the listing of certain species, races, or populations when the status of their numbers is such that its continued existence is threatened or endangered. Upon such a determination, the habitat critical to the survival and restoration of the species is to be protected from destruction or adverse modification.

With respect to critical habitat designation for a hydropower site ranking process, the concept of a threatened or endangered status could be applied as the criteria for determining critical habitat. Habitat would be designated critical and protected from any further degradation by hydropower development if the species is either offically designated under the Federal ESA or under an established State classification system.

This approach would serve to designate and protect habitat only for species, races, or populations whose numbers are themselves critical or become critical.

2. Council Production Goals

Under Section 201 of the program the Council is seeking to have production goals established for anadromous fish for the Columbia Basin. These goals are to be established by species and tributary basin. Information from which to establish the goals is to be presented to the Council by April 15, 1984. For resident fish and wildlife, the establishment of numerical goals is not anticipated in the near furure and may not be pertinent as with anadromous fish.

The data base for goal establishment is to include analysis of the production potential of Salmon and Steelhead habitat. That habitat which is necessary to achieve the adopted goals would be designated as critical under this alternative and protected from any further degradation by hydroelectric development.

If the goals require less than the existing habitat within the basin, then further hydropower development would be allowed in specified areas. If all habitat is needed to meet goals, then all would be designated critical and potentially protected from further adverse effects from future hydro power development. If more habitat is needed to meet goals, then areas presently inaccessible to anadromous fish may also be critical in anticipation of provided access.

Under this alternative key resident fish and wildlife habitat types might be protected. This could include wetland, riparian and bottomland habitat types which are critical to the survival of key species, a diversity of species, or large populations of preferred speices.

3. All Essential Habitat as Critical

Under this alternative all habitat that is essential to fish and wildlife species, regardless of population status would be designated as critical and protected from any degradation resulting from hydropower development. For anadromous fish this would include all spawning, rearing and migration habitat utilized by any number of fish. For wildlife the key habitat types would again be riparian, aquatic, wetland and bottomland.

RECOMMENDATIONS FOR CUMULATIVE EFFECTS METHODOLOGY

INTRODUCTION

Measure 1204(b)(2) of the Columbia Basin Fish and Wildlife Program calls for development of criteria and methods for assessing potential cumulative effects of hydroelectric development on fish and wildlife. The method(s) will need to be usable in both the political and scientific arenas. To succeed, the method must be sound, easily understood, and relate to the concerns of the public as to cumulative effects of hydropower operations on public use of fish and wildlife. Comprehensiveness in a biological sense may need to be compromised for ease of public understanding and effectiveness in public, not scientific, forums.

As with critical habitat, a review of definitions of cumulative effects is warranted. It must be remembered, however that the program directs cumulative effects to be focused on present and future hydroelectric development.

CEQ definition: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

FERC definition: Those impacts which increase or reinforce one another and create one or more environmental conditions which produce an effect greater than any impact taken by itself; hence, resulting in a cumulative impact. This includes effects that are not simply incremental or additive but also those impacts that are synergistic or multiplicative. Synergistic effects are those which taken together yield a total effect greater or lesser than the simple sum of the individual effects.

ANADROMOUS FISH

A cumulative effects methodology for anadromous fish must address basic fish survival and the public's utilization or concern for fisheries. The methodology for these fish could examine cumulative effects of hydropower development on three concerns: (1) productivity: (2) production area and; (3) thresholds of biological and public concern.

1. Productivity

Production rates are a good indicator of the health of an anadromous fish population or stock. Application of Ricker's spawner/recruitment concept satisfies this requirement. The method could focus on the effects of hydropower development on spawner/recruitment ratios, to be set by the Northwest Power Planning Council. Ratios, as discussed under "Thresholds" can be established to account for fish survival and for suitable fish harvest. However in establishing spawner/recruitment ratios one must consider ratios for natural production, artificial production, and natural production supplemented by artifical production. The Council's program does focus on an eventual production program that integrates artifical and natural production. As increments of hydropower mortality are placed upon a fish stock, the harvestable surplus, of great concern to the resource user and economy is measureable.

2. Production Area

In addition to productivity the cumulative effects of hydropower development on production area is of concern. Habitat for anadromous fish has already been significantly reduced by post power development. The documentation of cumulative habitat loss is easily accomplished and for any possible additional loses can also be quantified. However, how this data might be used in a site ranking process could be dificult. Rather, habitat area might best be addressed through the study on critical habitat already discussed above.

3. Thresholds

Two thresholds could be included in the methodology.

(1) The productivity necessary to maintain the stock biologically.

(2) The stock productivity at which meaningful harvest could occur.

Stock maintenance requires a 1:1 spawner:recruit ratio over an extended period. An occasional drop below this level can be withstood by the stock provided productivity is restored above 1:1. Prolonged production below 1:1, however, results in extinction. Harvest requires ratios greater than 1:1. The extent of rational harvest is determined by the degree of productivity greater than 1:1.The Council could establish ratios that provide for a balance of the need for power and for meaningful harvest. Concerns for coordination of ocean harvest with in river restoration obligations could also be addressed by the establishment of the stock/recruitment ratios.

RESIDENT FISH

A cumulative effects methodology for resident fish would be similar to that addressed under anadromous fish. The method(s) must include basic fish survival and the public's utilization or concern for resident fish. The methodology would examine three concerns: (1) productivity; (2) production area and; (3) thresholds of biological and public concern. Resident fish have been significantly affected by changes in habitat due to hydroelectric development but in some cases this has been beneficial. Resident fish production has become increasingly important in areas where no anadromous fish runs remain.

1. Productivity

Production levels are a good indicator of the health of resident fish populations. Production goals set by the Council would be different for species of special emphasis such as the white sturgeon, biologically an anadromous fish but confined presently because dams have blocked mitgration. Other resident fish species of special interest include the kokanee, Dolly Varden (bull trout), and westslope cutthroat trout. The production goal for these species may be set at a higher level. Again as in anadromous fish, resident fish goals should consider natural as well as artificial production or some combination. Realistic goals could be set to maintain the population level biologically and still have a meaningful harvest. Specific goals could be set within the Columbia River Basin and generic goals set region-wide.

2. Production Area

As with anadromous fish, the production area would include the amount of habitat within a basin/subbasin used for spawning, rearing, and migration. If the quantity and quality of habitat is not available to meet the Council's production goals, then the production area will need to be enhanced or expanded. Portions of the production area may need to be enhanced, such as spawning beds, to increase productivity and in return meet realistic goals for resident fish.

3. Thresholds

Thresholds to be addressed by the methodology.

(1) The productivity necessary to maintain the stock or population biologically.

(2) The stock productivity at which meaningful harvest can occur.

(3) The minimum amount of production area needed to sustain the species biologically.

WILDLIFE

A cumulative effects methodology for wildlife should address biological survival as well as the public's utilization or concern for wildlife. The method(s) should examine (1) productivity and/or population levels; (2) quality and quantity of remaining habitat; (3) thresholds of biological, public, and governmental concern.

1. Productivity and/or Population Level

Productivity and/or populaton levels will serve as a good indicator of the health of wildlife species. Application should measure natality or production of new individuals and total population. The Council should set realistic goals by basin/subbasin, with recommendations from governmental agencies, even for a "healthy wildlife population". The population goals set by the Council should not exceed the "carrying capacity" of the existing habitat within the basin/subbasin. The carrying capacity of an area would be the maximum

number/population that can be supported in a given habitat. Populations used as indicators need to be "key" or "indicator" species that depend heavily on habitat affected by hydroelectric development.

2. Quality and Quantity of Remaining Habitat

Wildlife habitat should be keyed towards wetland, riparian, aquatic, and bottomland area, or habitat mainly affected by hydroelectric development. Once habitat types have been established, "key" or "indicator" species can be listed which depend totally or partially on these areas by basin/subbasin. The method(s) need to establish the relationship between habitat types and instream flow.

From the population goals set by the Council, it can be determined if the existing habitat will need to be improved or expanded to meet these goals. Goals for a healthy population should include both meaningful harvest and habitat necessary to maintain the species biologicaly.

3. Thresholds

Thresholds that need to be addressed by the methodology.

(1) The productivity necessary to maintain the species biologicaly.

(2) The species productivity at which meaningful harvest can occur.

(3) The minimum amount of habitat needed to sustain the species biologically.

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