Issue Paper 2. CWC Public Benefits Discussion: Ecosystem Benefits

The Issue

This issue paper is concerned solely with the definition and quantification of ecosystem benefits for purposes of economic quantification under SBX7-2. There are other, related ecosystem issues that must be addressed as part of the SBX7-2 project evaluation process.

Exactly what ecosystem-related benefits should be eligible for public funding under the SBX7-2 (the Act) definition of ecosystem benefits? Do any and all economic benefits that result from use of storage for ecosystem improvement qualify as an ecosystem public benefit? Do all benefits that result from "restoration of aquatic ecosystems and native fish and wildlife" qualify as ecosystem benefits? How is the method of alternative cost, used to limit benefit claims, affected by the definition of ecosystem benefits?

Background

SB X7-2 Chapter 8 (the Act), codified as California Water Code §79740 et seq., requires the California Water Commission (Commission) to develop and adopt, by regulation, methods for quantification and management of public benefits associated with eligible water storage projects.

The Act's definition of ecosystem improvement public benefits is:

> *Ecosystem improvements, including changing the timing of water diversions, improvement in flow conditions, temperature, or other benefits that contribute to restoration of aquatic ecosystems and native fish and wildlife, including those ecosystems and fish and wildlife in the Delta.*

The Act also states that

> *79746. (b) No project may be funded unless it provides ecosystem improvements as described in paragraph (1) of subdivision (a) of Section 79743 that are at least 50 percent of total public benefits of the project funded under this chapter.*

So, the definition of what can be counted may influence the ranking of projects, the share of all public benefits that are for ecosystem, and through cost allocation, the exact definition and scope of ecosystem benefits will influence the share of cost allocated to public benefits.

The Act also states

> *79742. A project shall not be funded pursuant to this chapter unless it provides measurable improvements to the Delta ecosystem or to the tributaries to the Delta.*

A common approach to evaluating ecosystem benefits is known as "ecosystem services." Ecosystem improvements can provide a set of physically quantifiable benefits, called ecosystem services, which have value to identifiable groups of people. Ecosystem services usually result in "use" values where economic benefits are caused by an expected consumption, catching, viewing or other direct interaction with the resource. Ecosystem services may include, among other things, benefits obtained by recreational users, or benefits obtained by water users such as increased supply or reduced costs of water supply. The concept of ecosystem services is critical to the discussion below because the economic benefits of "restoration of aquatic ecosystems and native fish and wildlife" can be difficult to quantify using the quantity of ecosystem, fish or wildlife alone, but the services provided by the use of ecosystems, fish and wildlife can often be more easily valued.

People may value ecosystems, fish and wildlife even if they expect to obtain no services or use of the resource at all. These values are called non-use values. These types of economic benefits are often

estimated using survey methods. Total benefits of an ecosystem, fish or wildlife may include use values (for example, ecosystem services value) and non-use values.

Chapter 8 provides that funds should be allocated "for public benefits. . . that . . . are cost effective." The Act recognizes that the State should not pay more than necessary for an ecosystem public benefit, and the potential cost of alternative means of achieving the same amount of ecosystem, fish or wildlife physical benefit is an important part of a benefit-cost analysis. In particular, the alternative cost of achieving a physical benefit may provide an upper limit to the economic benefit claimed. If it is apparent that the ecosystem services plus non-use benefits exceed the alternative cost, then the alternative cost should be used as the measure of benefit because the beneficiary should not pay more than the cost of achieving the same physical benefit by other means. The economic methods proposed by staff for measuring benefits consider and include this relationship.

Note that the alternative cost is not affected by the dollar amount of ecosystem services or non-use benefits provided by the ecosystem improvement. However, the measures of ecosystem services, non-use benefits, and alternative cost all require forecasts of physical benefits. Any benefit measure is greatly facilitated by forecasts of ecosystem, fish and wildlife quantities, but such forecasts are frequently unavailable or highly contentious.

Staff's proposed option #1

Any economic benefits that result from "the restoration of aquatic ecosystems and native fish and wildlife" are ecosystem benefits.

Some examples of how this clarification would be applied are:

1. A salmon population increases because of improvement in flow conditions and temperature, and as a result recreational catch increases. The increased catch would be counted as an ecosystem benefit because it was caused by ecosystem improvement.

2. Water is released from storage in order to contribute to flow and temperature to help restore aquatic ecosystems and native fish and wildlife. Some of this water can be diverted or exported downstream without diminishing the ecosystem benefit. The water supply benefit of this diversion or export would not be counted as an ecosystem benefit because it was not caused by "restoration of aquatic ecosystems and native fish and wildlife." There is an ecosystem benefit, but the water supply benefit was incidental to the ecosystem operation and was not caused by the ecosystem restoration.

3. Improvements in flow conditions in the Delta are expected to contribute to the recovery of Delta smelt, and this recovery is expected to reduce pumping restrictions and consequently increase water supply. The water supply benefit caused by recovery of Delta smelt would be counted as an ecosystem improvement benefit. We note that this type of benefit might not be consistent with current practice which gives a low weight to proposed actions that have not yet resulted in recovery. That is, forecasted benefits based on the use of storage for the benefit of endangered fish that rely on modified fishery operation regulations might be contested by fish and wildlife agencies.

4. A water supply project south-of-Delta would replace some Delta supply with a local supply, thereby reducing Delta exports and improving flow conditions in the Delta. The Delta flow improvement is expected to contribute to restoration of aquatic ecosystems and native fish and wildlife. The flow improvement would be protected and would not be available for export by others; therefore, it would provide an ecosystem benefit. In practice, this type of benefit may be challenging to implement since the water rights and contractual commitments associated with other users may be

affected. Also note that the additional water supply benefit in this example would be estimated as the cost savings from not using the Delta supply.

In summary, for option #1, any ecosystem services resulting from restoration of aquatic ecosystems and native fish and wildlife would be ecosystem benefits regardless of who obtains the benefits. In addition, any non-use values for the ecosystem, fish and wildlife would count as ecosystem benefits as well. When alternative cost is compared to total benefit (use plus non-use), this approach would provide the largest ecosystem benefit and therefore would justify the largest alternative cost as a measure of ecosystem benefit.

Staff's proposed option #2

A benefit should be categorized based on the type of benefit obtained, regardless of whether or not it was enabled by restoration of aquatic ecosystems and native fish and wildlife.

- In the first example above, since recreational fishermen are the beneficiaries of the value of the catch, that benefit would be assigned to recreation. The benefit would be an eligible public benefit under the Act, but it would not count under 79747(b) as part of the 50% ecosystem requirement. Non-use benefits associated with the actions could be counted as ecosystem benefits.
- In the second example above, the water supply benefit of this diversion or export would not be counted as an ecosystem benefit simply because it is a water supply benefit (same result as in option #1 above). There would still be an ecosystem benefit to count that is separate and additive with the water supply benefit.
- In the third example, the water supply enabled by relaxed pumping restrictions accrues to water users in the regions receiving the supply increment. It would be counted as a water supply benefit. It has been noted that a water supply benefit caused by ecosystem improvement and consequent modification of regulatory requirements might be regarded as contentious and speculative to claim even as a water supply benefit because fish and wildlife agencies would not allow any water supply benefit until the species has actually recovered.
- In the fourth example, the flow improvement is an eligible ecosystem public benefit, but any recreation or water supply benefits would be counted as recreation or water supply, not ecosystem. Under option #2, the eligible ecosystem public benefits would be limited to the non-use economic value that the public places on the type and amount of restoration of aquatic ecosystems and native fish and wildlife provided.

Option #2 would provide a smaller ecosystem benefit than option #1 and might therefore justify a smaller alternative cost as a measure of ecosystem benefit. Note, however, that the total amount of benefit is the same as option #1. The benefits are just allocated differently. Therefore, the same alternative cost would be justified, but on the basis of ecosystem and non-ecosystem benefits, and some of the alternative cost benefit measure would be allocated to the non-ecosystem benefits.

Other Issues

1. Special status of native fish and wildlife

   An additional issue involves the Act's apparent deference to native fish and wildlife. The ecosystem benefits must contribute to "restoration of aquatic ecosystems ***and native*** fish and wildlife" (§79743(1), emphasis added). For ecosystem benefits, should only benefits to native fish and wildlife be counted? Should economic benefits caused by ecosystem improvements for non-native species, such as striped bass, be included?

2. Eligibility is unclear for restoration of terrestrial habitat or creation of new aquatic habitat.

The Act specifies that ecosystem benefits "contribute to restoration of aquatic ecosystems ***and*** native fish and wildlife" (emphasis added). Restoration of aquatic ecosystems is specifically included, but not restoration of terrestrial ecosystems. Should restoration of terrestrial habitat be eligible? Also, creation of artificial aquatic ecosystems, for example, in a reservoir, may not be eligible. Should any actions that benefit native fish and wildlife be eligible as ecosystem improvements?

3. Improved water supply reliability for refuges is perceived by many to be an important ecosystem objective. New storage could provide water supply for refuges. Should water supply benefits for refuges be counted as ecosystem, or water supply? Note that this decision could hinge on the definition of "aquatic ecosystems" in 2 above. Are refuge wetlands aquatic or terrestrial ecosystems?