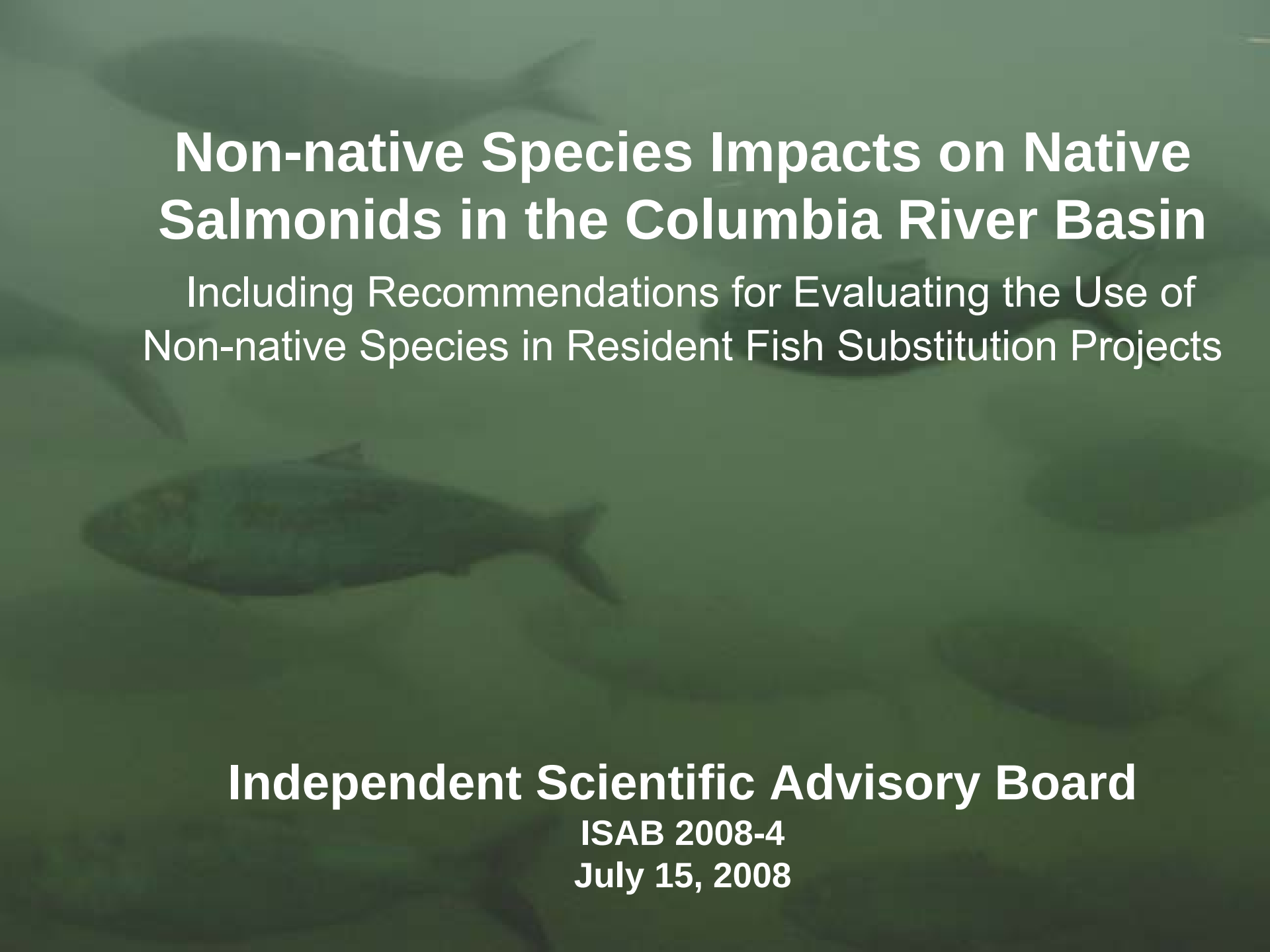
Non-native Species Impacts on Native Salmonids in the Columbia River Basin

Including Recommendations for Evaluating the Use of Non-native Species in Resident Fish Substitution Projects



Independent Scientific Advisory Board

ISAB 2008-4

July 15, 2008

Review Objectives

- Describe history of non-native species introductions and current status in the Columbia River Basin
- Document the biological impacts and risks to native salmonids
- Describe the current status of mgt. actions taken to reduce impacts

Review Objectives (cont.)

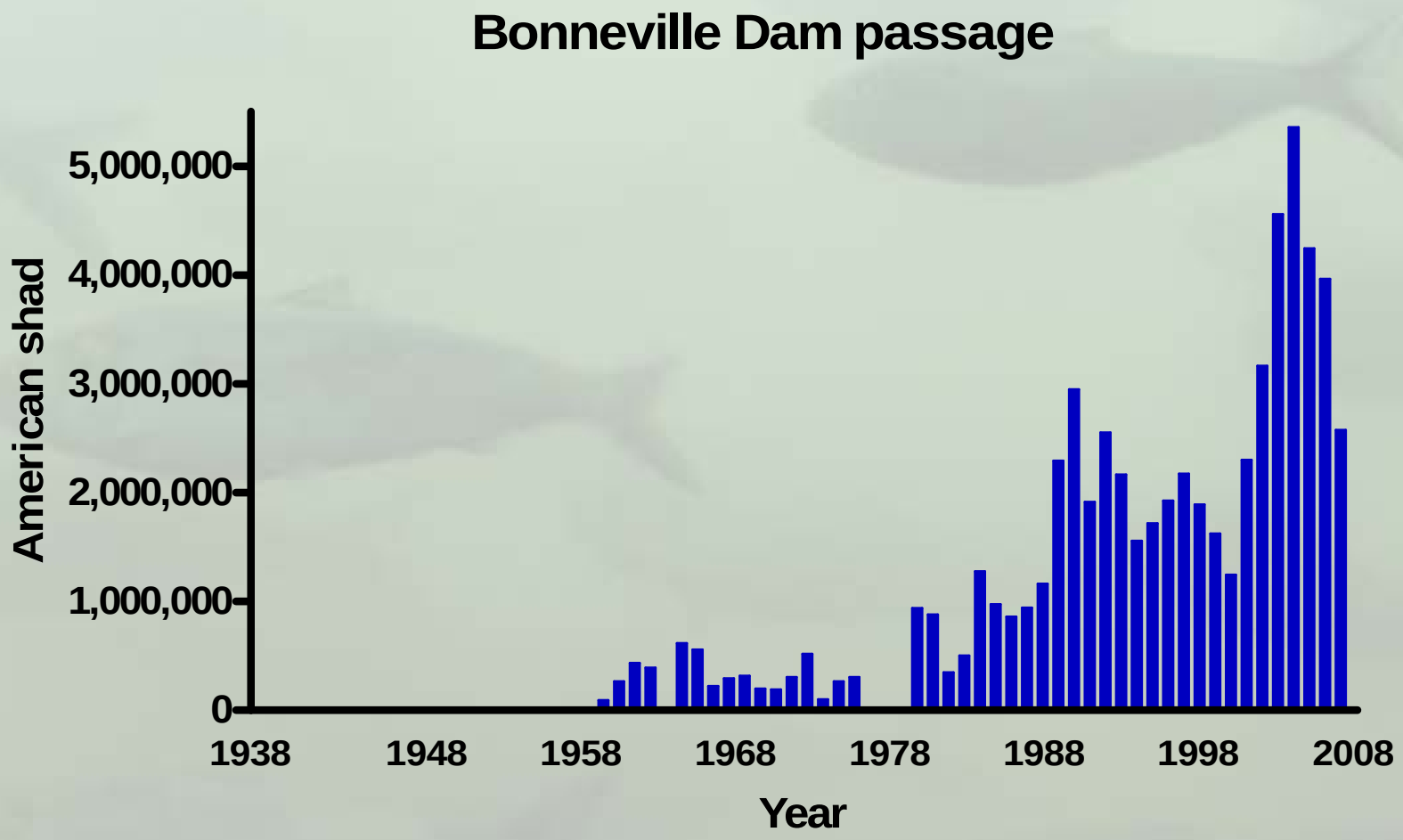
- Describe the changing cultural values and current federal and state laws, policies, and plans regarding non-native species
- Recommend strategies for detecting, preventing, and controlling non-native species
- Recommend scientific criteria for evaluating resident fish substitution projects

History of Non-native Species in the Columbia River Basin

- General pattern of introductions
- Early economic and cultural reasons
- History of American shad in the Columbia

Smallmouth bass

American shad



Role of Habitat Alteration in Facilitating Non-native Expansion

- Hydrosystem development
- Forestry practices
- Agricultural practices
- Urbanization

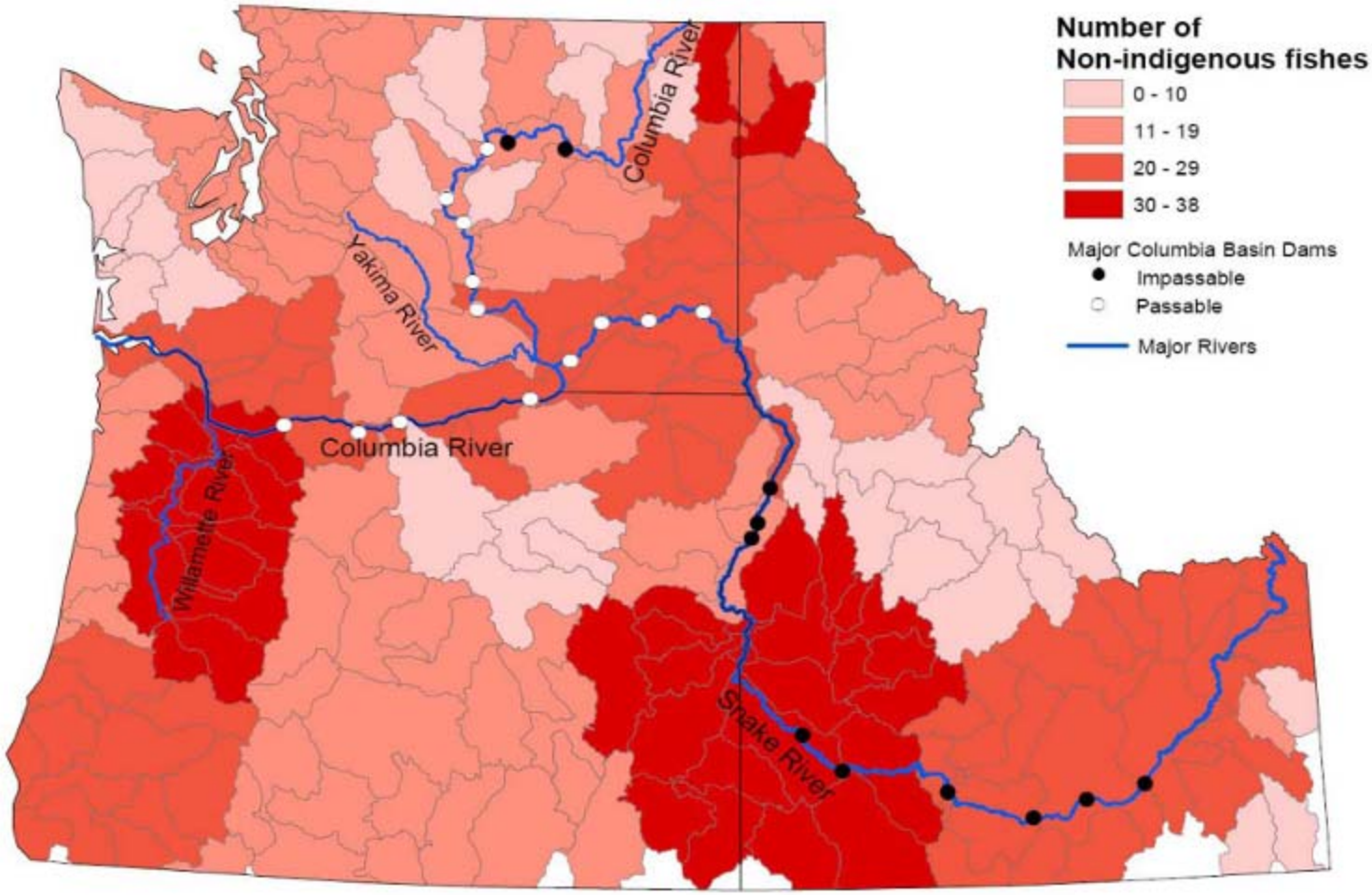
Eurasian milfoil

Current Non-native Fish Species Distribution in the PNW

- A recent survey of the occurrence of NNS in the PNW in 2007 (Sanderson et al) indicated that NNS made up 54%, 46%, and 60% of the resident fish species in WA, OR, and ID, respectively.

- The survey also indicated that many of the subbasins in the CRB have from 20 to 38 species of non-native fishes – Figure 2

Current Non-native Fish Species Distribution in the PNW



Biological Impacts and Risks to Native Salmonids

- Predation
- Competition for food and habitat
- Food web alterations
- Interbreeding
- Disease transmission and parasites
- Non-native invertebrates
- Non-native plants

Red swamp crayfish

Current Status of Management Actions to Reduce Non-native Species Impacts

- Eradication or reduction
  - Hand-pulling or mechanical harvest (weeds)
  - Toxicants
  - Netting
  - Electrofishing
- Barriers
- Targeted sport-angling

Walleye

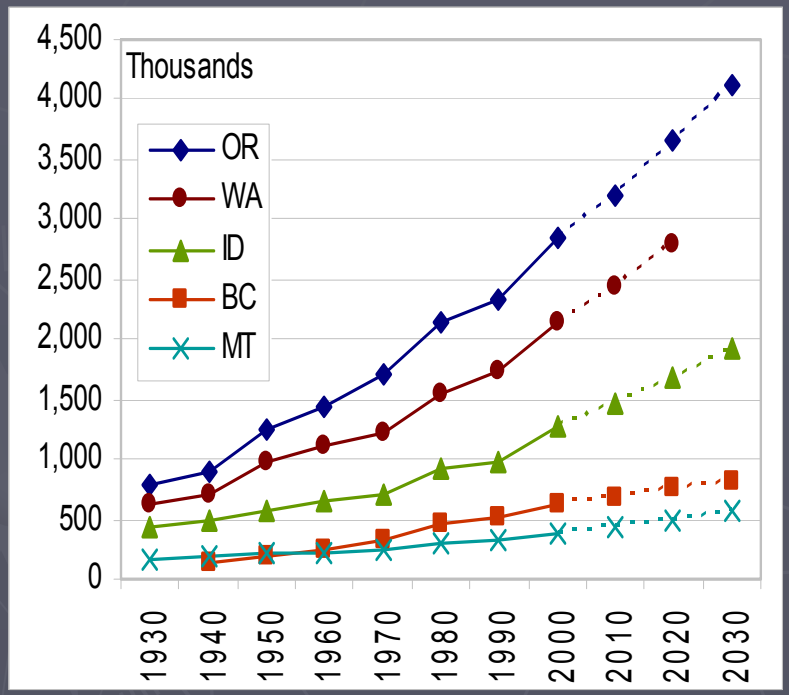
Changing Cultural Values, Laws, and Management Plans

- Changing cultural values
- Laws, policies, and plans
  - Federal and state laws and regulations
  - Management/action plans
- National Scientific Societies

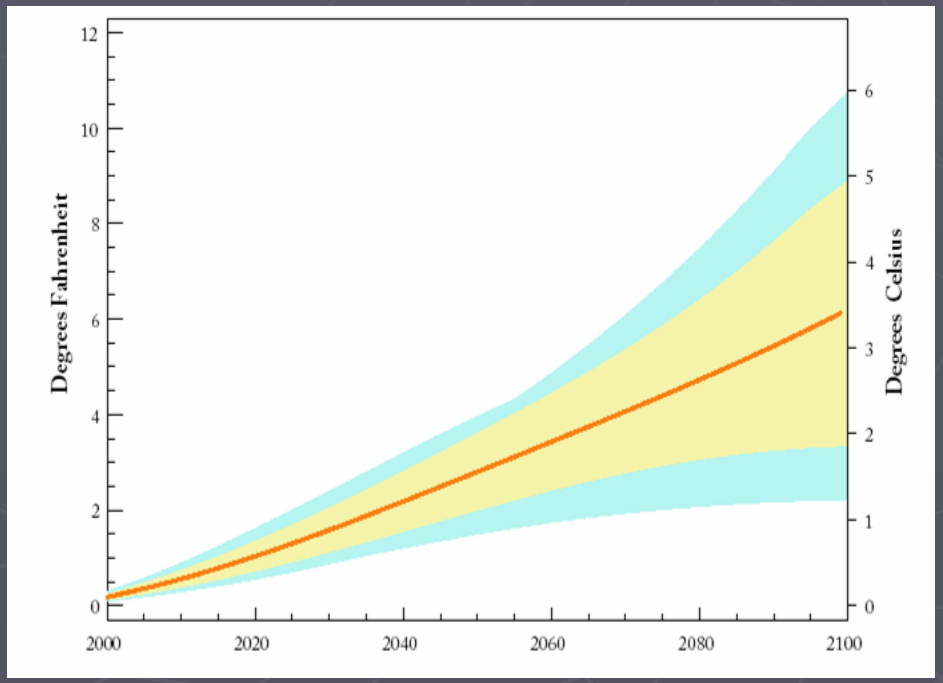
Channel catfish

Future Concerns

- Climate change
- Human population growth and development



US and Canada censuses. State and regional district projections for 2010 and 2020



The latest climate model simulations show a +1 to +6 ºC warming for the PNW by 2100.

Recommendations

- Exploratory Surveillance and Monitoring
- Enforcement
- Prevention
- Fisheries Management

Quagga Mussels
from Lake Meade, CA

Recommendations (cont.)

- Habitat Restoration
- Planning
- Education
- Research

Northwest Power and Conservation Council
Dayton Creek

Evaluating the Use of Non-native Fish in Resident Fish Substitution Projects

- Background
  - FWP mitigation for anadromous fish losses in blocked areas includes resident fish substitution which can be introduced species and artificial production can be used to sustain those species.
  - The Program further states that those substitution species must be “compatible with the continued persistence of native resident fish species”; and “appropriate risk management needs to be maintained in using the tool of artificial propagation”.

Environmental Risk Assessment

- During proposal reviews the ISRP found that the FWP statements regarding risk to native species did not provide clear risk management criteria or methods to evaluate whether a proposed project may be able to provide benefits without undesirable consequences.

- As an alternative to conducting one or more lengthy research studies to determine level of risk to native species, an *environmental risk assessment* can be effective for determining risk prior to introducing a non-native species.

Risk Assessment Format

- A list of 15 topics with associated questions asks for the documentation on rationale and risks needed to produce a thorough risk assessment.

- Several of the more important topics include:
  - interactions with other species in system
  - genetic effects
  - escape/dispersal
  - carrier of disease/parasites
  - monitoring for success or negative consequences.

ISAB Recommendation

- A thorough Environmental Risk Assessment of potential negative impacts on native fish species should be completed and submitted, concurrently with project proposals, for all resident fish substitution projects in which a non-native species is selected for substitution.

- The ISAB understands that the Council, ISRP, and fish and wildlife managers would need to be involved in development of a final ERA template and *this recommendation is a starting point and not an endpoint.*