

FOCUS AREAS OF RESEARCH RELATIVE TO THE STATUS OF THE 2004 AND 2005
BROODS OF THE CENTRAL VALLEY FALL CHINOOK SALMON STOCK

Freshwater Biological Focus

- 1) Was the level of parent spawners too low, for natural or hatchery populations?
- 2) Was the level of parent spawners too high, for natural or hatchery populations?
- 3) Was there a disease event in the hatchery or natural spawning areas?
- 4) Was there a disease event in the egg incubation, fry emergence, rearing, or downstream migration phases?
- 5) Was there any disease event during the return phase of the 2 year old jacks?
- 6) Were there mortalities at the time of trucking and release of hatchery fish?
- 7) Was there a change in the pattern of on-site release of hatchery fingerlings compared to trucked downstream release?
- 8) Was there a change in recovery, spawning and/or release strategies during hatchery operations?
- 9) Did thermal marking occur for any hatchery releases? What were the effects of this or other studies (e.g. genetic stock identification of parental broodstock)?
- 10) Was there a change in the methodology or operations of the SF Bay net pen 'acclimation' program for trucked hatchery fish?
- 11) Were there any problems with fish food or chemicals used at hatcheries?

Freshwater Habitat Areas Focus

- 1) Were there drought or flood conditions during the spawning, incubation, or rearing phases?
- 2) Was there any pollution event where juveniles were present?
- 3) Was there anything unusual about the flow conditions below dams during the spawning, incubation, or rearing phases?
- 4) Were there any in-water construction events (bridge building, etc.) when this brood was present in freshwater or estuarine areas?
- 5) Was there anything unusual about the water withdrawals in the rivers or estuary areas when this brood was present?
- 6) Was there an oil spill in the estuary when the 2005 brood was present, as juveniles or jacks?
- 7) Were there any unusual temperature or other limnological conditions when this brood was in freshwater or estuarine areas?
- 8) Was there any unusual population dynamics of typical food or prey species used by juvenile Chinook salmon in the relevant freshwater and estuarine areas?
- 9) Was there anything unusual, in the same context as above for juvenile rearing and outmigration phases, about habitat factors during the return of the 2 year olds from this brood?
- 10) Were there any deleterious effects caused by miscellaneous human activities (e.g., construction, waterfront industries, pollution) within the delta and SF bay areas?
- 11) Was there a change in the recovery of juvenile outmigrants observed in the USFWS mid-water trawl surveys and other monitoring programs in the Delta.

Freshwater Species Interactions Focus

- 1) Was there any unusual predation by bird species when this brood was in freshwater or estuarine areas?
- 2) Was there any unusual sea lion abundance or behavior when this brood was in freshwater or estuarine areas?
- 3) Was there any unusual striped bass population dynamics or behavior when this brood was in freshwater or estuarine areas?
- 4) Were northern pike present in any freshwater or estuarine areas where this brood was present?
- 5) Is there a relationship between declining Delta smelt, longfin smelt, and threadfin shad populations in the Delta and CV Chinook survival.
- 6) Was there additional inriver competition or predation with increased hatchery steelhead production?

Marine Biological Focus

- 1) Was there anything unusual about the ocean migration pattern of the 2004 and 2005 broods?
- 2) Was there anything unusual about the recovery of tagged fish groups from the 2004 and 2005 broods the ocean salmon fisheries?
- 3) Has the bycatch in non-salmonid fisheries (e.g., whiting, groundfish) increased?

Marine Habitat Areas Focus

- 1) Were there periods of reduced upwelling or other oceanographic physical conditions during the period of smolt entry into the marine environment, or during the period of marine residence up to the return to freshwater of the jacks?
- 2) Were there any effects to these fish from the 'dead zones' reported off Oregon and Washington in recent years?
- 3) Were plankton levels depressed off California, especially during the smolt entry periods?
- 4) Was there a relationship to an increase in krill fishing worldwide?
- 5) Limnology: temperature, salinity, upwelling, currents, red tide, etc.
- 6) Were there any oil spills or other pollution events during the period of ocean residence?
- 7) Was there any aquaculture occurring in the ocean residence area?
- 8) Was there any offshore construction in the area of ocean residence, for wave energy or other purposes?

Marine Species Interactions Focus

- 1) Was there any unusual population dynamics of typical food or prey species used by juvenile Chinook salmon in marine areas? (plankton, krill, juvenile anchovy or sardines, etc.)
- 2) Was there an increase in bird predation on juvenile salmonids caused by a reduction in the availability of other forage food?
- 3) Was there an increase of marine mammal predation on these broods?
- 4) Was there predation on salmonids by Humboldt squid?
- 5) Was there increased predation on salmonids by other finfish species (e.g., lingcod)?

Cumulative Ecosystem Effects Focus

- 1) Were there other ecosystem effects?
- 2) Were there synergistic effects of significant factors?