



OCEAN CONDITION INDICATORS SHOW DECENT JUVENILE SALMON SURVIVAL IN 2012 OFF NW COAST

Posted on Friday, January 18, 2013 (PST)

The array of ocean condition “indicators” monitored by NOAA Fisheries’ Northwest Fisheries Science as a means of judging potential juvenile salmon survival showed mixed signals in 2012, but seemed to contain more good than bad.

“Our best guess is to expect average to above-average returns of coho in 2013 and Chinook in 2014, but similar to the statement we made last year, the mixed signals add greater uncertainty to our predictions,” according to the updated adult coho and spring chinook forecast produced through the NWFSC’s “Ocean Ecosystem Indicators of Salmon Marine Survival in the Northern California Current” research project.

Ocean conditions data has been collected and analyzed through the project since 1998. The annual project reports, the latest posted on line this week, “present a number of physical, biological, and ecosystem indicators to specifically define the term ‘ocean conditions.’” The data is used to forecast the survival of salmon 1–2 years in advance.

The report can be found at:

<http://www.nwfsc.noaa.gov/research/divisions/fed/oeip/a-ecinhome.cfm>

The report discusses how physical and biological ocean conditions may affect the growth and survival of juvenile salmon in the northern California Current off Oregon and Washington.

“The ocean is still a little goofy,” NWFSC oceanographer Bill Peterson said of ocean conditions that both in 2011 and last year that were in various stages of transition at about the time Columbia River juvenile salmon and steelhead were emerging from freshwater and starting the saltwater portion of their life.

“2012 was characterized by a steady move from La Niña conditions towards an ENSO-neutral state. Combined with persistently negative PDO values throughout the year, a high biomass of lipid-rich northern copepods supporting the base of the food-chain, and an above average abundance of winter-time ichthyoplankton (larval stages of fish-prey for salmon), 2012 had the potential to be a good year for supporting juvenile salmon entering the ocean,” the report says.

La Nina conditions, and negative Pacific Decadal Oscillation climatic conditions, generally bode well for salmon and steelhead entering and maturing in the northern Pacific.

“This positive bio-physical outlook was tempered a bit by a late start to upwelling, warm sea-surface temperatures through much of the summer, and a trend towards El Niño conditions, but overall the ocean conditions in 2012 appear to be greatly improved compared to the last several years,” the report says.

Indicator data – whether it be for the number of young fish netted during trawling expeditions, prey availability, water temperature or the upwelling of nutrients – is individually ranked in three

tiers. Lower numbers indicate better ocean ecosystem conditions, or "green lights" for salmon growth and survival, with ranks 1-4 green; 5-10 yellow, and 11-14 red.

The 2012 scores were compared to the previous 13 years of the study, and proved the fourth best for estimated juvenile salmon survival in the 14 years of research.

The researchers use the analysis of the suite of indicators to complement existing indicators used to predict adult salmon runs, such as jack returns, smolt-to-adult return rates (Scheurell and Williams 2005) and the Logerwell production index.

"The strength of this approach is that biological indicators are directly linked to the success of salmon during their first year at sea through food-chain processes. These biological indicators, coupled with physical oceanographic data, offer new insight into the mechanisms that lead to success or failure for salmon runs," the report introduction says.

"In addition to forecasting salmon returns, the indicators presented here may be of use to those trying to understand how variations in ocean conditions might affect recruitment of fish stocks, seabirds, and other marine animals. We reiterate that trends in salmon survival track regime shifts in the North Pacific Ocean, and that these shifts are transmitted up the food chain in a more-or-less linear and bottom-up fashion as follows: upwelling to nutrients to plankton to forage fish to salmon.

"The same regime shifts that affect Pacific salmon also affect the migration of Pacific hake and the abundance of sea birds, both of which prey on migrating juvenile salmon."

