Pest Risk Assessment for *Mnemiopsis leidyi (Leidy's comb jelly)* in Oregon

Identity

Name: ***Mnemiopsis leidyi***

Taxonomic Position: Phylum: Ctenophora Class: Tentaculata Order: Lobata Family: Bolinopsidae

Common Names: Leidy's comb jelly, American comb jelly

Risk Rating Summary

Relative Risk Rating:

Numerical Score: (on a 1-9 scale) 2 LOW

Uncertainty: MODERATE

The MODERATE level of uncertainty attributed to this risk assessment is due to several factors. Risk assessment is not an exact science. The format this risk assessment follows was originally developed for forest pest species and, as such, fails to take into consideration characteristics of invasive species that may be unique to marine organisms and their habitats. Lastly, although *Mnemiopsis leidyi* is a well-studied invader in the Black Sea and nearby environs, its invasion potential for other areas remains uncertain.

IDENTIFICATION: *Mnemiopsis leidyi* is a ctenophore or comb jelly (not a true jellyfish) that can grow to 4 inches in length. It has a translucent, lobed, oval body covered with four rows of ciliated (hair-like) combs which are irridescent by day and, like most ctenophores, bioluminesce or glow blue-green when disturbed. *M. leidyi* is native to the Western Atlantic and can be found in coastal and estuarine waters. While some divers may be familiar with ctenophores most people are not. The most commonly seen ctenophore on the Oregon Coast is the native species *Pleurobranchia bachei* which often wash up on beaches where they are called sea gooseberries or cat's eyes (Mills and Haddock 2007).

Recommendation

M. leidyi has a deservedly bad reputation from its invasion of the Black Sea that has landed it on the 100 of the World's Worst Invasive Alien Species.[1] Nevertheless it seems unlikely to be able to establish a persistent population either off of the Oregon Coast or in any Oregon estuaries. Although *M. leidyi* may not be a concern to Oregon there are many other unwanted species that can and are being transported and introduced around the world via ballast water. Ballast water is the primary vector by which invasive species such as *M. leidyi* are introduced and continued support for ballast water management is vital to prevent the adverse effects of invasive species in Oregon's coastal and estuarine waters.

[1] http://www.issg.org/database/species/search.asp?st=100ss&fr=1&str=&lang=EN

Risk Rating Details

Establishment Potential is LOW

The primary patterns that appear important for establishment of persistent *M. leidyi* populations are not met by the conditions present along the Oregon Coast or in Oregon's river dominated estuaries. The variables associated with successful *M. leidyi* population growth are water temperatures adequate for successful reproduction (several months >10C or 50F), high zooplankton food abundance (>24 μg C liter) and low predation pressure (generally by other ctenophores and scyphozoans (true jellyfish) (J. Costello and C. Mills pers. com). The Pacific Northwest has a robust native population of ctenophores including the predatory ctenophores *Beroe* spp. as well as several abundant, large jellyfish species that are known predators of ctenophores such as *Cyanea capillata* (lion's mane jellyfish) and *Chrysaora fuscescens* (Pacific sea nettle) (C. Mills pers. com). Warmer sea surface temperatures caused by a la Nina event may be capable of sustaining a temporary population of *M. leidyi* but a return to normal oceanic conditions would suppress successful reproduction.

Spread Potential is MODERATE

By virtue of being a planktonic marine organism the spread potential for M. leidyi is high. The coastal ocean environment has few natural barriers to dispersal and planktonic organisms are readily spread by ocean currents. In addition, planktonic organisms such as ctenophores are readily entrained in ballast water and moved in this manner. I've downgraded the risk to moderate to help adjust for these factors which may be rated artificially high by this risk assessment format.

The primary means by which *M. leidyi* could be expected to be introduced into Oregon waters is via ballast water originating in either the Western Atlantic Ocean or the greater Mediterranean region. According to a report published by the Oregon Ballast water Task Force (Flynn and Sytsma 2004) vessels from these ports make up less than 1% of all vessel traffic entering Oregon waters. Current ballast water regulations requiring at sea exchange further limit the likelihood of introduction.

Environmental and Economic Impact is LOW to MODERATE

Both the economic and environmental impacts associated with *M. leidyi* result from its voracious consumption of zooplankton including but not limited to pelagic fish eggs and larvae (such as those of anchovies and sardines). Populations of *M. leidyi* have caused fisheries crashes both via the consumption of commercially important fish species (as eggs and larvae) and competition for food with fishes that rely on zooplankton for food. Cascading tropic effects have been recorded from the Black Sea and the Agean Sea (Global Invasive Species Database 2011). Consumption of zooplankton by *M. leidyi* can also cause an increase in phytoplankton by releasing them from normal levels of consumption. It is important to note, however, that all of these cases occurred in waters where the native ctenophore diversity was limited to a single species and few predators of *M. leidyi* existed. Along the West Coast there is both an abundance of native *M. leidyi* predators and a robust native ctenophore diversity that native fishes such as anchovy and rockfish are already adapted to.

There is the potential for *M. leidyi* to consume the eggs, larvae and planktonic food resources of commercially important fish species such as anchovy and rockfish (some of which are ESA listed as threatened) and potentially cause cascading food web impacts that could impact other listed species such as salmonids. However, consensus among several ctenophore experts is that given the inadequate conditions for establishment of a permanent, reproducing population of *M. leidyi* speculation on the impacts of this ctenophore may be moot.

Human Health Impact Potential is NONEXISTENT

Unlike cnidarians, ctenophores lack any stinging cells and are not dangerous when they come into contact with humans.

References

Flynn, K. and M. Sytsma 2004. Report on the Oregon Ballast Water Management Program in 2004. September 2004. http://www.clr.pdx.edu/docs/2004ORBWRprt.pdf

Global Invasive Species Database 2011. Mnemiopsis leidyi. http://www.issg.org/database/species/ecology.asp?fr=1&si=95 Accessed March 2011.

Mills, C.E. and S.H.D. Haddock, 2007. Ctenophores. pp. 189-199, with 5 plates. In Light and Smith's Manual: Intertidal Invertebrates of the Central California Coast. Fourth Edition (J.T. Carlton, editor). University of California Press, Berkeley.

Format

This pest risk assessment (PRA) is based on the format used by the Exotic Forest Pest Information System for North America. For a description of the evaluation process used, see Step 3 – Pest Risk Assessment under Guidelines at: http://spfnic.fs.fed.us/exfor/download.cfm.

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