Northwest Power and Conservation Council

August 27, 2009

MEMORANDUM

TO: Council Members

FROM: Jim Ruff, Manager-Mainstem Passage and River Operations

SUBJECT: Council decision on three letters about follow-up actions for invasive mussels

At the August 12, 2009, Council meeting in Spokane, state representative Eric Anderson from Idaho and I presented some potential follow-up actions concerning the threat of invasive mussels for your consideration. At the meeting, the Council was extremely concerned that these invasive mussels, which can be unknowingly spread by contaminated recreational watercraft, are getting much closer to Columbia basin waters. As a result of that discussion, the Council directed staff to prepare letters asking agencies to implement specific actions related to preventing the introduction of invasive mussels into the Columbia River basin, providing for their control and related mitigation efforts to minimize the ecological and economic impacts that these invasive species would cause.

Accordingly, attached are three letters for your review and approval. The first letter is to Secretary of Interior Salazar asking Department of Interior agencies to institute a mandatory inspection and decontamination requirement for all watercraft leaving mussel-infested waters in the Southwest, such as the Lake Mead National Recreation Area on the Colorado River. This letter is similar to Idaho Governor Otter's letter that was sent to the Secretary of Interior on June 9, 2009.

The second letter is to Brigadier General William Rapp of the Northwestern Division of the Corps of Engineers. The purpose of that letter is threefold: 1) to alert the Corps of Engineers to an impending threat to the multipurpose federal dams in the Columbia River basin and to the ecosystem posed by invasive mussels; 2) to request the Corps to take immediate action to initiate early detection monitoring for the presence of these invasive mussels at each of its dams in the Columbia basin; and 3) to ask the Corps to initiate and complete risk assessments and mitigation planning related to these mussels at every Corps project.

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Executive Director

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The third letter is to Barry Thom at NOAA Fisheries. The purpose of that letter is fourfold: 1) to alert the agency to an impending threat posed by invasive mussels to the multipurpose federal dams in the Columbia River basin and to the ecosystem; 2) to request the agency take immediate action to sign onto the *Columbia River Basin Interagency Response Plan for Zebra Mussels and Other Dreissenid Species*; 3) to encourage it to actively participate and coordinate all mussel monitoring, prevention and mitigation efforts in the two primary existing regional coordination forums: the 100th Meridian Initiative-Columbia River Basin Team and the Western Regional Panel on Aquatic Nuisance Species; and 4) to encourage it to use the recently developed Quagga/Zebra Mussel Action Plan (QZAP) as the region's common plan for invasive mussel actions.

Northwest Power and Conservation Council

September 9, 2009

The Honorable Ken Salazar
Secretary of the Interior
1849 C Street NW
Washington, D.C. 20240

Dear Secretary Salazar,

The Northwest Power and Conservation Council, an interstate compact agency of Idaho, Montana, Oregon and Washington, was established under the authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act or Act). The Act directs the Council to develop a program to "protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries … affected by the development, operation, and management of [hydroelectric projects] while assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply." With its many major federal and non-federal hydropower dams, the Columbia and its tributaries comprise one of the most intensively developed river basins for hydroelectric power in the world. The basin produces, under normal precipitation, about half (16,200 average megawatts) of the electricity consumed in the Pacific Northwest.

As you know, quagga mussels (*Dreissena rostriformus bugensis*) were first detected in the western United States at Lake Mead in January 2007. Within two years, this destructive aquatic invasive species has spread throughout the lower Colorado River system and major water distribution systems, as well as into the states of Nevada, California, Arizona, Utah and Colorado.[1] These western states now face implementing multimillion-dollar control and mitigation programs to protect their water distribution systems, irrigation and hydropower infrastructure. The Council is extremely concerned that these invasive mussels, which can be unknowingly spread by contaminated recreational watercraft, are getting closer and closer to Columbia basin waters. Currently, only eight states in the western U.S. do not have either species of *dreissena* mussels (zebras or quaggas), including the Pacific Northwest states of Idaho, Montana, Oregon and Washington.

[1] Besides Lake Mead and Hoover Dam, some of the major dams, water bodies and aquaducts that *dreissenid* mussels have colonized recently include Davis Dam and Lake Mohave, Parker Dam and Lake Havasu, Imperial Dam, the Colorado River aquaduct into southern California, the Central Arizona Project canal and Lake Pleasant in Arizona, San Justo Reservoir south of San Francisco, Grand Lake in northern Colorado, and Electric Lake and Red Fleet Reservoir in northern Utah.

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Should invasive mussels enter Columbia Basin waters, the adverse impacts would be extreme -- affecting drinking water, irrigation, hydropower, navigation and recreational pursuits such as fishing and boating. It is estimated that to try to control these mussels, should they become established in Columbia Basin waters, would cost the region well over $100 million annually.

For your information, all four Northwest states now have legislation in place to help prevent the introduction of these invasive species into Columbia basin waters, e.g., the authority to inspect and decontaminate recreational watercraft, if necessary. Motorized and non-motorized watercraft are the primary vectors by which these invasive mussels are transported and spread from an infested body of water to other, non-infested waters such as in the Columbia River basin.

The most effective method of preventing the mussels' spread is to fully inspect all recreational vessels leaving infested water bodies such as Lake Mead. A mussel-infested watercraft named *Hello* was recently the subject of a multi-state search after a concerned citizen reported the contaminated boat traveling northward on Interstate 15 in Utah toward the State of Idaho. This boat originated at Lake Mead, where it had been allowed to leave the National Recreational Area without proper decontamination. Thankfully, and with the cooperation and assistance of the State of Washington, this watercraft was located, inspected and decontaminated in Spokane.

Accordingly, the Council strongly urges all Department of Interior agencies, including the National Park Service and the U.S. Fish and Wildlife Service, to immediately institute a mandatory inspection and decontamination requirement for all watercraft leaving mussel-infested waters such as Lake Mead in the Southwest. It will be much more cost-effective to contain and prevent invasive mussels from leaving infested waters than to try to either a) locate, inspect and decontaminate boats entering non-infested Northwest states or b) mitigate and control their spread once they have been introduced into non-infested Columbia Basin waters. In addition, we ask the Department of Interior to utilize its Lacey Act authority to enforce restrictions on the interstate transport of invasive mussels.

Our urgent requests for Department of Interior action are fully consistent with the Council's *2009 Columbia River Basin Fish and Wildlife Program*,[2] as well as federal Executive Order 13112 of February 3, 1999, which calls on all relevant federal agencies "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause."

The Northwest states of Idaho, Montana, Oregon and Washington are doing their part in trying to prevent the spread of invasive species such as quagga and zebra mussels. However, our states need federal assistance in helping to protect the remaining non-infested waters of the West.

Thank you for your favorable consideration of our concerns and requests.

Sincerely,

W. Bill Booth, Chair

[2] See the section on Non-Native Species Evaluation and Control on p. 100 of the pre-publication version of the 2009 Fish and Wildlife Program: http://www.nwcouncil.org/library/2009/2009-02.htm

Cc: NW Congressional delegation

Northwest Power and Conservation Council

September 9, 2009

Brigadier General William E. Rapp
Commander and Division Engineer
U.S. Army Corps of Engineers
Northwestern Division
P.O. Box 2870
Portland, OR 97208-2870

Dear General Rapp,

The Northwest Power and Conservation Council, an interstate compact agency of Idaho, Montana, Oregon and Washington, was established under the authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act or Act). The Act directs the Council to develop a program to "protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries … affected by the development, operation, and management of [hydroelectric projects] while assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply." With its many major federal and non-federal hydropower dams, the Columbia and its tributaries comprise one of the most intensively developed river basins for hydroelectric power in the world. The basin produces, under normal precipitation, about half (16,200 average megawatts) of the electricity consumed in the Pacific Northwest.

The purpose of this letter is threefold: 1) to alert the Corps of Engineers to an impending threat to the multipurpose federal dams in the Columbia River basin and to the ecosystem posed by invasive mussels; 2) to request the Corps to take immediate action to initiate early detection monitoring for the presence of these invasive mussels at each of its dams in the Columbia basin; and 3) to initiate and complete risk assessments and mitigation planning related to these mussels at every Corps project.

At the July 14, 2009, Council meeting in Portland, the Council was briefed by two scientists from the U.S. Bureau of Reclamation (USBR) about their experiences in trying to control invasive mussels in the West, particularly at Lake Mead and Hoover Dam on the Colorado River. The Council heard that quagga mussels (*Dreissena rostriformis bugensis*), and their close cousin zebra mussels (*Dreissena polymorpha*), were introduced into the Great Lakes in the ballast water of ships from Eastern Europe and the Ukraine in the late 1980s. As you know, quagga mussels were first detected in the western United States in January 2007 at Lake Mead, Nevada. Within two years, this destructive aquatic invasive species has spread throughout the lower Colorado

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River system and major water distribution systems,[1] as well as into the states of Nevada, California, Arizona, Utah and Colorado.[2] These western states now face implementing multimillion-dollar control and mitigation programs to protect their water distribution systems, irrigation and hydropower infrastructure. The Council is extremely concerned that these invasive mussels, which can be unknowingly spread by contaminated recreational watercraft, are getting closer and closer to Columbia basin waters. Currently, only eight states in the West do not presently have either species of *dreissena* mussels (zebras or quaggas), including the Pacific Northwest states of Idaho, Montana, Oregon and Washington. It is alarming that these mussels are getting much closer to invading waters of the Columbia River basin.

The Bureau scientists explained to Council members why *dreissenid* mussels are a problem species. First, they are a non-native species that has broad environmental tolerances and few natural predators in the U.S. They are prolific reproducers because they have early sexual maturity, high fecundity and a good dispersal mechanism. Moreover, the warmer weather in the West has allowed quagga mussels to reproduce much more quickly than in the East. For example, one adult female quagga can have up to six reproductive cycles in a single year, releasing up to a million eggs, and their microscopic larvae (called veligers) float freely downstream in the water currents.

Once *dreissenid* mussels colonize a water body, a number of significant problems are caused by them, including flow restriction or blockage of pipes, chemical degradation, mechanical damage, and alteration of aquatic ecosystems. Bureau staff showed the Council pictures of the trash racks protecting Hoover and Davis dams' powerhouse water intakes, where the four-inch gaps between the rack grates were literally closed in less than one year by massive quagga mussel populations.[3] They observed that mussels, if introduced into the Columbia River system, would wreak havoc with juvenile fish screens and bypass facilities at the mainstem Corps dams.

Invasive mussels would also significantly affect aquatic ecosystem of the Columbia basin. Since they are voracious filter feeding organisms, they can alter the food chain, impact water quality, cause habitat damage and create toxic accumulations when they die. Should these mussels become established in waters of the Columbia River basin, they would impact hydropower generating infrastructure, fish screens and passage facilities, navigation facilities, and water delivery systems resulting in costly treatment or cleaning measures. The USBR scientists indicated that, because they clog water intake and cooling pipes, mussels have affected water cooling systems for turbine bearings, compressors and transformers, with the potential to disrupt hydropower operations at its dams on the Colorado River.

What are the costs of trying to control invasive mussels? The Metropolitan Water District of Southern California delivers water to 19 million people in the greater Los Angeles area. It

[1] Besides Lake Mead and Hoover Dam, some of the major dams, water bodies and aquaducts that *dreissenid* mussels have colonized recently include Davis Dam and Lake Mohave, Parker Dam and Lake Havasu, Imperial Dam, the Colorado River aquaduct into southern California, the Central Arizona Project canal and Lake Pleasant in Arizona, San Justo Reservoir south of San Francisco, Grand Lake in northern Colorado, and Electric Lake and Red Fleet Reservoir in northern Utah.

[2] Some 27 million people rely on the Colorado River to irrigate crops, provide drinking water and operate businesses, produce hydropower and recreate.

[3] To view the USBR's slides, click on the following link: http://www.nwcouncil.org/news/2009/07/1.pdf.

expects to spend between $10 million and $15 million per year to address recent quagga mussel infestations in its 242-mile Colorado River aquaduct and reservoir water delivery system.

The State of Idaho has stated that, should invasive mussels enter Idaho waters, the adverse impacts would be extreme -- affecting drinking water, irrigation, hydropower and recreational pursuits such as fishing and boating. Idaho has estimated recently that to try to control these mussels would cost the state roughly $100 million annually. It is expected the cost to control a mussel outbreak in all four Northwest states would be several times that amount.

In addition, the Corps has estimated recently that, should invasive mussels become established in Lake Tahoe, Nevada, it could cost that area's tourism-dependent economy more than $22 million per year. Similarly, a 2005 report by the Pacific States Marine Fisheries Commission (PSMFC) found the cost for installing invasive mussel control systems at mainstem Columbia-Snake river hydroelectric projects could range from the hundreds of thousands of dollars to over a million dollars per facility. That report estimated the initial cost for a hypothetical *dreissenid* mussel mitigation strategy, based on two response scenarios (a sodium hypochlorite[4] injection system and use of anti-fouling paint), at 13 selected federal hydropower projects in the Columbia Basin would be over $23.6 million.

Perhaps more important than the direct costs related to removal of mussels once established, would be the loss of substantial regional investments related to recovery of salmon and steelhead listed under the Endangered Species Act. Also, if these invasive mussels become established within the Columbia basin, then costs related to ensuring safe passage through the Federal Columbia River Power System dams for juvenile and adult salmon and steelhead will undoubtedly increase substantially.

In summary, colonization of invasive mussels can significantly alter aquatic ecosystems. Should these invasive mussels become established in waters of the Columbia River basin, they would impact our hydropower generating and navigation infrastructure, fish screen and passage facilities, water delivery systems, and recreational facilities, resulting in costly treatment or cleaning measures. Moreover, the presence of invasive mussels in the Columbia River basin would complicate recovery and preservation efforts for aquatic species listed under the ESA (e.g., salmon, steelhead, bull trout, and Kootenai River sturgeon) and could even increase the number of listed species in basin. Finally, resources expended on controlling these mussels would likely be in addition to the expense of ongoing regional fish and wildlife restoration efforts, including actions for listed salmon and steelhead under the NOAA Fisheries 2008 biological opinion.

Based on the above information, the Council strongly urges the Corps to initiate and complete mitigation planning for invasive mussels, e.g., scoping the possible risks and impacts of *dreissenid* mussels at all of its mainstem dams and fish passage facilities and developing potential control measures. While some initial mitigation planning may have been done at a few Corps projects, we believe every federal dam in the Columbia basin is unique and thus each

[4] The Council notes the use of sodium hypochlorite as a tool to control invasive mussels at mainstem Columbia-Snake river hydropower dams would be problematic due to the expense for the chlorine and buffering system, as well as the environmental scoping and permitting that would need to be undertaken as required by NEPA and Endangered Species Act protections and requirements for listed salmonids.

project needs to have a completed "vulnerability assessment," as well as a rapid response plan, in the event that mussels are found in Columbia basin waters.

Corps staff has indicated that funding for these risk assessments would normally come out of the Corps' O&M budget, which is limited. The Council understands the Corps, in its FY 2011 Congressional budget cycle, included funding requests to conduct veliger monitoring at its hydropower facilities, as well as specific allocations to prepare rapid response plans, including risk assessments at all facilities. While the Council will support and work with the Corps to identify and include funding for this important work in the Corps' FY 2011 budget, the Corps should immediately explore whether any funding options could be identified within the FY 2010 budget to enable initiation of vulnerability assessments and rapid response planning at some key federal projects in the Columbia basin beginning next year.

The Council also urges the Corps to increase its monitoring effort for mussel larvae (veligers) at its mainstem hydropower projects, as invasive mussels pose a serious risk to Corps projects' infrastructure (including fish passage, navigation and hydropower facilities), as well as the regional ecosystem. We understand the Corps will be conducting monitoring this summer for mussel veligers at only Bonneville, The Dalles and John Day dams,[5] and that the Corps is in the scoping stage of setting priorities for other veliger monitoring locations for 2010. The level of monitoring for mussels in 2010 should be based on funding availability and the extent of ongoing sampling by others in the basin, i.e., priority monitoring areas should be well coordinated with others in the region through the 100th Meridian Initiative-Columbia Basin Team.

While the Council will support and work with the Corps to identify and include funding for this veliger monitoring at all federal hydropower projects as part of its FY 2011 budget, the Council again urges the Corps to immediately explore whether funding exists within the FY 2010 O&M budget to enable expansion of veliger monitoring sites to other high priority Corps dams in 2010.

Finally, the Council encourages the Corps to embrace and use the recently developed Quagga/Zebra Mussel Action Plan (QZAP) as the region's common plan for invasive mussel actions. The actions identified in the QZAP will form the basis for the region's response to the threat of *dreissenid* mussels. However, a critical gap exists in the basin concerning the availability of information and frameworks necessary to expedite environmental compliance permitting to allow implementation of rapid response actions. An estimated $200,000 is needed in the near term, in either funding or staff support, to help fill this gap.[6] The Corps should support this effort and try to identify some funding (or staff resources) to expedite this permitting work in the interim.

All of these actions are particularly important in the Columbia basin because the USBR indicated to the Council that it was unprepared for the 2007 invasion of quagga mussels at Lake Mead and Hoover Dam. They also noted how rapidly the mussels have spread throughout the lower Colorado River and the water infrastructure. Accordingly, to address this urgent threat to the

[5] These hydropower projects were identified as priority areas for monitoring through discussions with the 100th Meridian Initiative-Columbia Basin Team.

[6] In the long term, funding for this permitting work will likely come from future Congressional appropriations to implement the QZAP.

Columbia River basin, all project operators, including the Corps, should begin immediately to: a) monitor for invasive mussels; b) develop risk assessments and rapid response plans; c) align their priority actions with those identified in the QZAP; and d) coordinate their mussel monitoring, prevention and mitigation efforts through the 100th Meridian Initiative-Columbia River Basin Team and the Western Regional Panel on Aquatic Nuisance Species.

Our urgent requests for Corps action are fully consistent with the Council's *2009 Columbia River Basin Fish and Wildlife Program*,[7] as well as federal Executive Order 13112 of February 3, 1999, which calls on relevant federal agencies "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause."

The Council is prepared to work cooperatively with the Corps and others in the region to help prevent the spread of invasive mussels and make advance preparations in the event these destructive species are introduced into Columbia basin waters. We look forward to your timely and favorable response to our requests in this letter.

Sincerely,

W. Bill Booth, Chair

Cc: Lt. Colonel Michael J. Farrell, U.S. Army Corps of Engineers
Colonel Anthony Wright, U.S. Army Corps of Engineers
Colonel Steven R. Miles, U.S. Army Corps of Engineers
David Ponganis, U.S. Army Corps of Engineers
Greg Delwiche, Bonneville Power Administration
J. William McDonald, U.S. Bureau of Reclamation
Barry Thom, National Oceanic and Atmospheric Administration
Robin Thorson, U.S. Fish and Wildlife Service
Randy Fisher, Pacific States Marine Fisheries Commission
Lyman Thorsteinson, U.S. Geological Survey
NW Congressional Delegation

[7] See the section on Non-Native Species Evaluation and Control on p. 100 of the pre-publication version of the Fish and Wildlife Program.

Northwest Power and Conservation Council

September 9, 2009

Mr. Barry Thom
Acting Regional Administrator
NOAA Fisheries
Northwest Region
P.O. Box
Portland, OR 972

Dear Barry,

The Northwest Power and Conservation Council, an interstate compact agency of Idaho, Montana, Oregon and Washington, was established under the authority of the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act or Act). The Act directs the Council to develop a program to "protect, mitigate, and enhance fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries … affected by the development, operation, and management of [hydroelectric projects] while assuring the Pacific Northwest an adequate, efficient, economical, and reliable power supply." With its many major federal and non-federal hydropower dams, the Columbia and its tributaries comprise one of the most intensively developed river basins for hydroelectric power in the world. The basin produces, under normal precipitation, about half (16,200 average megawatts) of the electricity consumed in the Pacific Northwest.

The purpose of this letter to NOAA Fisheries is fourfold: 1) to alert the agency to an impending threat to the multipurpose federal dams in the Columbia River basin and to the ecosystem posed by invasive mussels; 2) to request the agency take immediate action to sign onto the *Columbia River Basin Interagency Response Plan for Zebra Mussels and Other Dreissenid Species*; 3) to encourage it to actively participate and coordinate all mussel monitoring, prevention and mitigation efforts in the two primary existing regional coordination forums: the 100th Meridian Initiative-Columbia River Basin Team and the Western Regional Panel on Aquatic Nuisance Species; and 4) to encourage it to use the recently developed Quagga/Zebra Mussel Action Plan (QZAP) as the region's common plan for invasive mussel actions.

At the July 14, 2009, Council meeting in Portland, the Council was briefed by two scientists from the U.S. Bureau of Reclamation (USBR) about their experiences in trying to control invasive mussels in the West, particularly at Lake Mead and Hoover Dam on the Colorado River. The Council heard that quagga mussels (*Dreissena rostriformis bugensis*), and their close cousin zebra mussels (*Dreissena polymorpha*), were introduced into the Great Lakes in the ballast water of ships from Eastern Europe and the Ukraine in the late 1980s. As you know, quagga mussels

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were first detected in the western United States in January 2007 at Lake Mead, Nevada. Within two years, this destructive aquatic invasive species has spread throughout the lower Colorado River system and major water distribution systems,[1] as well as into the states of Nevada, California, Arizona, Utah and Colorado.[2] These western states now face implementing multimillion-dollar control and mitigation programs to protect their water distribution systems, irrigation and hydropower infrastructure. The Council is extremely concerned that these invasive mussels, which can be unknowingly spread by contaminated recreational watercraft, are getting closer and closer to Columbia basin waters. Currently, only eight states in the West do not presently have either species of *dreissena* mussels (zebras or quaggas), including the Pacific Northwest states of Idaho, Montana, Oregon and Washington. It is alarming that these mussels are getting much closer to invading waters of the Columbia River basin.

The Bureau scientists explained to Council members why *dreissenid* mussels are a problem species. First, they are a non-native species that has broad environmental tolerances and few natural predators in the U.S. They are prolific reproducers because they have early sexual maturity, high fecundity and a good dispersal mechanism. Moreover, the warmer weather in the West has allowed quagga mussels to reproduce much more quickly than in the East. For example, one adult female quagga can have up to six reproductive cycles in a single year, releasing up to a million eggs, and their microscopic larvae (called veligers) float freely downstream in the water currents.

Once *dreissenid* mussels colonize a water body, a number of significant problems are caused by them, including flow restriction or blockage of pipes, chemical degradation, mechanical damage, and alteration of aquatic ecosystems. Bureau staff showed the Council pictures of the trash racks protecting Hoover and Davis dams' powerhouse water intakes, where the four-inch gaps between the rack grates were literally closed in less than one year by massive quagga mussel populations.[3] They observed that mussels, if introduced into the Columbia River system, would wreak havoc with juvenile fish screens and bypass facilities at the mainstem Corps dams.

Invasive mussels would also significantly affect aquatic ecosystem of the Columbia basin. Since they are voracious filter feeding organisms, they can alter the food chain, impact water quality, cause habitat damage and create toxic accumulations when they die. Should these mussels become established in waters of the Columbia River basin, they would impact hydropower generating infrastructure, fish screens and passage facilities, navigation facilities, and water delivery systems resulting in costly treatment or cleaning measures. In addition,

What are the costs of trying to control invasive mussels? The Metropolitan Water District of Southern California delivers water to 19 million people in the greater Los Angeles area. It expects to spend between $10 million and $15 million per year to address recent quagga mussel infestations in its 242-mile Colorado River aquaduct and reservoir water delivery system.

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[1] Besides Lake Mead and Hoover Dam, some of the major dams, water bodies and aquaducts that *dreissenid* mussels have colonized recently include Davis Dam and Lake Mohave, Parker Dam and Lake Havasu, Imperial Dam, the Colorado River aquaduct into southern California, the Central Arizona Project canal and Lake Pleasant in Arizona, San Justo Reservoir south of San Francisco, Grand Lake in northern Colorado, and Electric Lake and Red Fleet Reservoir in northern Utah.

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The State of Idaho has stated that, should invasive mussels enter Idaho waters, the adverse impacts would be extreme -- affecting drinking water, irrigation, hydropower and recreational pursuits such as fishing and boating. Idaho has estimated recently that to try to control these mussels would cost the state roughly $100 million annually. It is expected the cost to control a mussel outbreak in all four Northwest states would be several times that amount.

In addition, the Corps has estimated recently that, should invasive mussels become established in Lake Tahoe, Nevada, it could cost that area's tourism-dependent economy more than $22 million per year. Similarly, a 2005 report by the Pacific States Marine Fisheries Commission (PSMFC) found the cost for installing invasive mussel control systems at mainstem Columbia-Snake river hydroelectric projects could range from the hundreds of thousands of dollars to over a million dollars per facility. That report estimated the initial cost for a hypothetical *dreissenid* mussel mitigation strategy, based on two response scenarios (a sodium hypochlorite[4] injection system and use of anti-fouling paint), at 13 selected federal hydropower projects in the Columbia Basin would be over $23.6 million.

Perhaps more important than the direct costs related to removal of established mussels would be the loss of substantial regional investments related to recovery of salmon and steelhead listed under the Endangered Species Act. Also, if these invasive mussels colonize within the Columbia basin, then the costs related to ensuring safe passage through the Federal Columbia River Power System dams for juvenile and adult salmon and steelhead will undoubtedly increase substantially.

In summary, colonization of invasive mussels can significantly alter aquatic ecosystems. Should these invasive mussels become established in waters of the Columbia River basin, they would impact our hydropower generating and navigation infrastructure, fish screen and passage facilities, water delivery systems, and recreational facilities, resulting in costly treatment or cleaning measures. Moreover, the presence of invasive mussels in the Columbia River basin would complicate recovery and preservation efforts for aquatic species listed under the ESA (e.g., salmon, steelhead, bull trout, and Kootenai River sturgeon) and could even increase the number of listed species in basin. Finally, resources expended on controlling these mussels would likely be in addition to the expense of ongoing regional fish and wildlife restoration efforts, including actions for listed salmon and steelhead under the NOAA Fisheries 2008 biological opinion.

Based on the above information, the Council strongly urges NOAA Fisheries to immediately sign onto the *Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels and Other Dreissenid Species* dated October 1, 2008, prepared by the 100th Meridian Initiative-Columbia River Basin Team. The Council notes that NOAA Fisheries is the only regional agency that has yet to sign and endorse this plan. The stated purpose of the Rapid Response Plan "is to coordinate a rapid, effective and efficient interagency response in order to delineate, contain, and when feasible, eradicate zebra, quagga and other *dreissenid* mussel populations if they are introduced in Columbia River basin waters." Due to its responsibility for ESA-listed

[4] The Council notes the use of sodium hypochlorite as a tool to control invasive mussels at mainstem Columbia-Snake river hydropower dams would be problematic due to the expense for the chlorine and buffering system, as well as the environmental scoping and permitting that would need to be undertaken as required by NEPA and Endangered Species Act protections and requirements for listed salmonids.

salmon and steelhead, NOAA Fisheries needs to participate fully in any interagency response effort.

In addition, the Council strongly encourages NOAA Fisheries to engage, participate and coordinate all mussel monitoring, prevention and mitigation efforts within the two primary existing regional coordination forums: the 100th Meridian Initiative-Columbia River Basin Team and the Western Regional Panel on Aquatic Nuisance Species. The federal action agencies, Northwest states, USFWS, USGS and others have been active participants. Given NOAA's role and efforts in protecting and recovering listed salmon and steelhead in the Pacific Northwest, your agency needs to be an active participant in both of these forums.

Finally, the Council encourages NOAA Fisheries to embrace and use the recently developed Quagga/Zebra Mussel Action Plan (QZAP) as the region's common plan for invasive mussel actions. The actions identified in the QZAP will form the basis for the region's response to the threat of *dreissenid* mussels.

These requests are particularly important in the Columbia basin because the USBR indicated to the Council that it was unprepared for the 2007 invasion of quagga mussels at Lake Mead and Hoover Dam. The Bureau also noted how rapidly the mussels have spread throughout the lower Colorado River and the water distribution infrastructure.

Our urgent requests for NOAA Fisheries' participation in these efforts are fully consistent with the Council's *2009 Columbia River Basin Fish and Wildlife Program*,[5] as well as federal Executive Order 13112 of February 3, 1999, which calls on relevant federal agencies "to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause."

The Council is prepared to work cooperatively with NOAA Fisheries and others in the region to help prevent the spread of invasive mussels and make advance preparations in the event these destructive species are introduced into Columbia basin waters. We look forward to your timely and favorable response to our requests in this letter.

Sincerely,

W. Bill Booth, Chair

Cc: Brigadier General William E. Rapp, U.S. Army Corps of Engineers
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Greg Delwiche, Bonneville Power Administration
J. William McDonald, U.S. Bureau of Reclamation
Paul Lumley, Columbia River Inter-Tribal Fish Commission
Robin Thorson, U.S. Fish and Wildlife Service

[5] See the section on Non-Native Species Evaluation and Control on p. 100 of the pre-publication version of the Fish and Wildlife Program.

Randy Fisher, Pacific States Marine Fisheries Commission
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