

West Virginia Field Office
Post Office Box 1278
Elkins, West Virginia 26241

August 18, 1999

Colonel Dana Robertson
District Engineer
U.S. Army Corps of Engineers
502 Eighth Street
Huntington, West Virginia 25701

Dear Colonel Robertson:

The U.S. Fish and Wildlife Service has reviewed the project plans and Biological Assessment (BA) for a barge loading facility in the Ohio River near river mile (RM) 215.2 to 215.8. Richards and Sons' Inc. has submitted a Rivers and Harbors Act Section 10 and Section 404 of the Clean Water Act permit application (Public Notice No. 199600843) to build this facility. Your letter, dated April 2, 1999 requested we initiate formal consultation pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 *et seq.*). This document represents the Service's biological opinion on the effects that the proposed activity will have on the federally listed species, the fanshell mussel, Cyprogenia stegaria. Because the Service concurs with the "not likely to adversely affect" determination for the bald eagle, Haliaeetus leucocephalus, and the pink mucket, Lampsilis abrupta, this opinion only addresses impacts to C. stegaria.

CONSULTATION HISTORY

10/31/96 The District issues a public notice (199600842) for Richards and Sons' Inc. proposed sand and gravel loading facility along the right descending bank of the Ohio River, at RM 215.5.

11/27/96 The Service provides a comment letter on the public notice detailing potential impacts to fish and wildlife resources as a result of the proposed project and requested that an mussel surveys be conducted at the site to determine if endangered species may be present.

02/24/99 The Service receives the Biological Assessment (BA) for the Bald Eagle, Pink Mucket, and Eastern Fanshell near a Proposed Barge Loading Facility in the Ohio River, Mile 215.2 to 215.8.

03/26/99 The Service notifies the District that it did not concur with the determination that the

proposed project is “not likely to adversely affect” C. Stegaria, . However, the Service did concur with the “not likely to adversely affect” determination for the bald eagle, Haliaeetus leucocephalus, and the pink mucket, Lampsilis abrupta. The Service suggests that the District initiates formal consultation on the proposed project.

04/06/99 The Service receives a letter from the District dated April 2, 1999 requesting that formal consultation be initiated for the proposed project.

BIOLOGICAL OPINION

Description of the Proposed Action

Shelly Materials, Inc. (formerly Richards and Sons, Inc.) proposes to construct, operate, and maintain a sand and gravel loading facility along the right descending bank of the Ohio River at river mile (RM) 215.5 at Portland, Meigs County, Ohio. Work below ordinary high water elevation of the Ohio River would include the placement of 12 steel sheet piling cells measuring 24 feet in diameter along approximately 1,980 feet of shoreline. The cells would be filled with sand and gravel. The facility would consist of three separate areas. The upstream and downstream fleets, each 462 feet in length, would each extend 185 feet from the normal pool shoreline (NPS). Each fleet would hold 9 barges (three long and three wide) for a total of 18 barges. Each fleet would contain three mooring cells. The middle fleet would extend 1,052 feet along the shoreline, and 220 feet out from the NPS. The loading dock, which would consist of a barge, would measure 30 feet by 150 feet and would be secured by two mooring cells. The conveyor system would extend from the shoreline to the loading dock. The middle fleet would hold 12 barges (4 long and 3 wide) and contain a total of 6 mooring cells. Riprap would be placed along 510 feet of the shoreline behind the barge loading dock. The purpose of the project is to load sand and gravel products for shipment to concrete contractors.

General Biology and Life History of the Species

Freshwater mussels are sedentary filter-feeders, filtering oxygen and food from the water column. The breeding season is initiated by changes in water temperature. Females hold unfertilized eggs in water tubes within specialized regions of the gills called marsupia. Males liberate sperm into the water and females lying downstream uptake the sperm with incoming water. The eggs are then fertilized in the water tubes within the marsupium. The fertilized eggs develop into minute bivalve larvae, or glochidia, which, in turn, develop over a period of days to months. While in the marsupium, developing glochidia are exposed to the adult's circulatory fluid, but not directly to the water column (Gardiner *et al.* 1991, Richard *et al.* 1991).

C. stegaria is a long-term breeder (bradyctictic). This means that fertilization takes place in late summer/fall, and the glochidia overwinter in the female and are discharged into the water column in spring (Ortman 1919). The glochidia are believed to be obligate parasites, with fish serving as the host organism. Host infestation is facilitated by C. stegaria by binding glochidia into long mucus conglutinates which resemble prey items. The gills of the host fish become infested when fish eat the

conglutinates. This suggests that the host fish for this mussel visually searches for its food. Although many unionids are probably host-specific, the degree of host specificity and host species for C. stegaria is unknown. However, recent studies suggest that the banded sculpin, Cottus carolinae and the greenside darter, Etheostoma blenniodes may be host fish for C. stegaria (Schultz and Marbain, 1998).

After encysting the host fish, the glochidia transform into juveniles. They then fall from their host and burrow into the substrate or attach to larger objects where they begin their sedentary existence. C. stegaria inhabits clean swept sand and gravel in medium to large rivers. Many aspects of the life history of these rare mussels are not known. Like other freshwater mussels, they feed and respire by filtering microscopic food particles and oxygen from the water column.

C. Stegaria has a medium-sized shell, subcircular in outline, that seldom exceeds 80mm in length. The shell's periostracum is typically light green or yellow and decorated with green rays and green mottling, and the nacre is typically silvery white (U.S. Fish and Wildlife Service, 1991).

Review of Endangered Species Information

C. stegaria historically occurred in the Ohio River and many of its tributaries in Pennsylvania, West Virginia, Ohio, Indiana, Illinois, Kentucky, Tennessee, Alabama, and Virginia, but has experienced drastic reductions in its range in the past century. Presently reproducing populations are known to occur in the Clinch River in Tennessee and Virginia, the Green and Licking River in Kentucky, and the Muskingum River in Ohio (U.S. Fish and Wildlife Service, 1991). Since 1992, living and fresh dead specimens indicate that a reproducing population of C. stegaria occurs in the lower Muskingum River in Ohio (Ohio Department of Natural Resources, 1993) and in the upper Ohio River in West Virginia at Neal Island, and Muskingum Island (ORINWR, pers. comm.), and below Belleville Locks and Dam (Ecological Specialists, 1998). Additionally, small apparently non-reproducing populations, may still persist in the Walhonding River in Ohio, the Kanawha River in West Virginia and Ohio, the Tippecanoe River in Indiana, the Wabash River system in Illinois and Indiana, the Barren River and Tygarts Creek in Kentucky, and the Tennessee and Cumberland Rivers in Tennessee (U.S. Fish and Wildlife Service, 1991). The Ohio River is currently functioning as a recovery area for this species.

Reasons for Decline and Continued Threats

Since mussels are sedentary, they are extremely susceptible to environmental degradation. The past range reductions of mussels are attributed to physical loss of habitat and degraded water quality related primarily to water impoundment, channelization, streambank clearing, and agriculture. Run-off from human waste, chemical outfalls, and coal mining has affected the water quality of many tributaries.

Pollution from municipal, agricultural, and industrial waste discharges has decreased or eliminated mussel populations directly and indirectly through extirpation of host fish species, resulting in mussel reproductive failures. Recent improvements in water quality in the upper Ohio River primarily as a result of promulgated regulations pursuant to the Clean Water Act requiring sewage and mine treatment facilities, and restrictions on industrial outfalls have allowed mussels and their fish hosts to return to

some of their former range. More thorough analysis of the environmental impacts of activities such as commercial sand and gravel dredging and barge loading and mooring facilities have also helped to facilitate the reestablishment of mussel and fish resources by protecting valuable physical habitat.

The greatest diversity and abundance of mussels are associated with clean-swept sand and gravel substrates. Chronic increases in turbidity and suspended sediments decrease the depth and amount of light penetration, affect primary productivity, decrease oxygen levels, increase water temperature, irritate or cause clogging of gills, and result in a blanket of silt on the substrate. Mussels may be directly affected by siltation through smothering. Siltation affects mussels by smothering eggs or larvae of the fish host populations and by reducing food availability. Siltation also fills interstitial spaces, eliminating spawning habitat critical to the survival of young fish.

The exotic and prolific zebra mussel, Dreissena polymorpha, was accidentally introduced to North America in the mid-1980's through ship ballast water from interior European ports. This species poses a severe threat to all native mussel species because it competes for space and food, and attaches to the native mussels in numbers that impair the mussel's ability to travel, burrow, and open and close its shell. The zebra mussel densities have increased dramatically since the early 1990's, when they were first identified in the Upper Ohio River Basin, reaching up to 4,922/meters squared (m^2), a significant increase from the 225/ m^2 found in 1997 at the same location. The 1998 survey also found that 89.9% of live native unionids were infested with zebra mussels.

Environmental Baseline

The proposed facility is located in the Racine Navigation Pool of the Ohio River. The freshwater mussel fauna of the Racine Navigation Pool are characterized as being particularly diverse with 31 species identified during recent surveys. A unionid bed exists from approximately RM 210.6 to 215.6 between 10 and 90 m from the bank. Mussels occur in lower densities downstream of RM 215.6, however comprehensive surveys have not been done beyond RM 216. The extent of the bed appears to be limited by unsuitable substrates upstream and by navigation traffic riverward. Six other unionid beds are located within the Racine Navigation Pool. A permit has recently been issued for construction of another barge loading facility over one of those mussel beds on the right descending bank between RM 204.5 and 207.7 that also contains C. stegaria.

The profile of the River bottom within the study area (RM 215.2 to 215.8) includes a shelf with a gradual slope to the 3.5m depth contour. This shelf extends to approximately 10 m from the NPS and has substrates that consist primarily of silt and clay. Beyond the shelf substrates are primarily boulder, cobble, gravel, and sand, with boulders becoming more prevalent further from the bank. Water depth within the study area ranges from 2.1 to 7.3 meters.

The mussel bed within the study area had an average density of about 3.5/ m^2 . Eighteen species were identified including three species listed as endangered within Ohio. These include the washboard, Megaloniais nervosa, the Ohio pigtoe, Pleurobema cordatum, and the monkeyface, Quadrula metanevra. Animals less than 5 years old were collected for 8 of the 9 species found in the quantitative

samples and comprised 56.8% of the samples. This indicates that reproduction is high and that densities could be expected to increase if conditions in the area remained undisturbed. Characteristics of this bed are similar to those found in nearby beds where federally listed species, including C. stegaria, have been found. Zebra mussel density averaged 121.6/m² with zebra mussels attached to 70% of the native unionids.

Alternatives Evaluated

The preferred alternative as proposed in the BA consists of 24-foot diameter steel mooring cells constructed between the upstream property line (approximately RM 215.3) and 700 feet upstream of the downstream property line (approximately RM 215.8). The riverward side of the cells would be 80 feet from the bank at normal pool. Minimum depth in this area is 12 feet. No dredging will be required. The riverbank within the project area is proposed to be modified to a 2:1 slope. The riverbank would then be stabilized with 10-inch rock from 0 to 24 feet from the waters edge at normal pool. The area between the rock and the top of the slope would be vegetated with early successional bottomland herbaceous and woody vegetation. The revegetation plan would be developed in coordination with the Ohio Department of Natural Resources and the Service. Mooring cells would be removed after the onshore area is mined, at an estimated time of 30 years.

Other alternatives considered included using barges spudded to the river bottom, moving the mooring cells onto the shallow shelf and permanently mooring a row of barges along the riverward face of the cells, and placing the cells further away from the bank. Although each of these alternatives would have fewer direct impacts to the mussel bed and the endangered species within it, each of these alternatives was determined to be not-feasible due to safety, navigation, or economic reasons.

Effects of the Action

Direct impacts of the proposed project include the permanent loss of approximately 1,019 m² of habitat within the mussel bed through the placement of the mooring cells when constructing the facility. Increased turbidity and sedimentation associated with project construction will cause a short term impairment of habitat quality. Siltation may result in reduced dissolved oxygen and increased organic material at the substrate level. At sublethal levels, silt interferes with feeding and metabolism in general. Because the C. stegaria typically burrows completely beneath the substrate, it is particularly susceptible to siltation, which clogs the substrate interstices and suffocates the animal. Mortality, injury, and stress to mussels is expected from siltation and other types of sedimentation both in the project construction area and downstream. The severity of this impairment will depend on the duration of construction time and the season in which the activity is conducted. Impacts would be lessened if construction was conducted in winter months when mussels are least active, and during low flow conditions.

In addition to the direct effects associated with project construction, there will be indirect and secondary impacts associated with mooring of barges over the mussel bed. The presence of the cells and barges moored at the proposed facility will create a hydraulic control that will decrease flow rates in the mooring area and therefore, increase siltation. This impact will affect at least 18,410/m² of

habitat within the mussel bed and between 37,000 and 99,100 unionids. Approaching and departing barge tows may cause prop scour and wash, resulting in increased turbidity and suspended sediments, increased disturbance and instability to substrates, and potential direct damage to mussels. These events will occur at a greater frequency and intensity than experienced under current conditions.

Removal of riparian vegetation in the project area may reduce habitat diversity, decrease bank stability and lead to increased erosion and sedimentation adjacent to the bank, as well as increase near shore water temperatures. This will further exasperate the impacts of increased sedimentation and turbidity in the project area.

In addition to the impacts to the unionids within the project area, these factors could also make habitats with the project area less suitable to fish host species. This would further reduce the reproductive success and recruitment rate of the bed.

Fleeting cells could provide hard stable substrate for colonization of zebra mussels. In addition, barges are known to provide a transport mechanism for introducing zebra mussels into an area, and increased barge and tow boat activity could provide a continuing source of infestation. Zebra mussels adversely affect unionids by competing for food and by attaching in such numbers that the infested unionid can not travel or burrow, or properly open and close its shell. High zebra mussel densities have been shown correlate with unionid mortality (Schlosser and Nalepa, 1994; Nalepa et al, 1996; Ricciardi et al, 1995). Unionid mortality has been observed in the Ohio River in areas with zebra mussel density of 1000 m^2 (Morrison, pers. comm.). Although zebra mussel densities in the project area could conceivably increase regardless of project construction, project operations will substantially increase the likelihood of increased infestation rates, and will limit the potential for infestation rates to decrease sometime in the future.

The cumulative effects of hydraulic alterations, increased sedimentation and turbidity, prop scour and wash, increased zebra mussel infestation, and loss of riparian habitat will impair the habitat quality of the area, increase stress on the existing mussels, decrease the vitality and reproduction success of existing mussels, decrease the potential for expansion of the mussel bed in both extent and density, limit habitat use by fish host species, and may have lethal effects on mussels directly beneath the mooring area. Although not quantifiable, the long-term effects of project operations will have a greater adverse impact on the mussel bed than the direct effects of project construction.

It should be noted that the project is located near the downstream end of the mussel bed, as a result, impacts from increased turbidity and suspended sediments will be less than if the project were positioned farther upstream. Zebra mussel glochidia will also generally be washed downstream and will not be carried over the main portion of the mussel bed. However, tows and barges passing over the mussel bed upstream of the facility when approaching or departing, will still increase the risk of damage to the main portion of the mussel bed from turbidity, wave wash, and zebra infestation.

The construction of the locks and dams has caused drastic alterations in river flow, morphology and function, such that no new habitat suitable for the species is likely to be formed. Past sand and gravel

dredging activities in the river have eliminated much of the habitat areas suitable for sustaining unionid populations. The proposed facility will allow for feasible land based sand and gravel operations to be conducted. In comparison to the impacts that would be caused by an equivalent amount of river based mining, impacts to the unionid community have been reduced.

However, within the Ohio River, the Racine pool is particularly noticeable for unionid abundance and diversity, as is demonstrated by the presence of both federal and state listed endangered species, and is functioning as a recovery area for those species. Six beds, including the one affected by this project, have been identified within a 14-mile reach of the Racine Pool. Two of these beds currently face impairment due to planned or proposed construction of barge mooring and fleeting facilities within the extent of the bed. The continued siting of facilities within unionid beds that are known or suspected to support C. stegaria, threatens the potential recovery of the species within the Ohio River.

Conclusion

After reviewing the current status of C. stegaria, the environmental baseline of the action area, and the effects of the proposed barge loading facility, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of C. stegaria. No critical habitat has been designated for this species therefore, none will be affected.

Incidental Take Statement

Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without any exception. Harm is further defined to include significant habitat modification or degradation that results in death or injury to species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of the incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Corps of Engineers so that they become binding conditions of any funding, permits, and/or approvals, as appropriate, issued to the applicant for the exception in section 7(o)(2) to apply. The Corps of Engineers has the continuing duty to regulate the activity covered by this incidental take statement. If the Corps of Engineers (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, authorization, or funding document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of

incidental take, the Corps of Engineers or the applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.12 (I)(3)].

Amount or Extent of Take

Construction of the proposed project will cause a permanent loss of habitat within the mussel bed. In addition, turbidity levels, the potential for increased zebra mussel infestation, and sedimentation in the bed may increase as a result of the construction and operation of this project. There is a potential, therefore, for the project to adversely impact endangered mussels either directly (killing mussels) or indirectly (reducing/eliminating reproductive success).

Incidental take will be difficult to detect because *C. stegaria* represents such a small percentage of the mussel community within the project area. However, based on the assumption that the status of the mussel community within affected area of the bed is indicative of the well-being of the subject endangered species, the anticipated level of take is defined as:

1. A decline of up to 25% in the density of the affected mussel bed after establishing a “before project” baseline. This should include adults and juveniles (juveniles being defined as less than 30 percent of maximum size encountered, measured as total length or animals \leq 3 years old based on external annual ring counts) other than *Amblema plicata*, which is a pollution tolerant species;
2. A decline of up to 25% in the live-to-recently dead ratio of all mussel species in the affected bed. “Recently dead” is defined as those shells exhibiting some shininess of the nacre, which have the ligament or hinge intact or which have some soft tissue remains, or dead less than one year;
3. A decline of up to 25% in the total number of species encountered in the affected bed;

If any or a combination of these criteria are exceeded in the mussel bed, the Corps should initiate, with the Service, an evaluation to determine the cause. If evidence suggests that the cause was related to the construction or operation of the mooring facility, reinitiation of consultation will be required.

Reasonable and Prudent Measures

All reasonable and prudent measures described below shall be implemented as terms and conditions of the permit. Implementation of these measures is mandatory.

1. Instream construction must be conducted in winter months when mussels are least active (November through March), and during low flow conditions.

2. Barges within the fleeting and loading area must be maneuvered by the use of a low power shift/tow boat.
3. Removal of riparian vegetation is restricted to the minimally necessary for project construction. After construction is complete, a riparian buffer zone that includes native bottomland hardwood species should be established and maintained for the entire project length, excluding only those areas that are required for movement of materials to and from the barge loading facility. This buffer zone must be at least 75 feet wide. A diagram of riparian buffer zone areas that will be maintained must be provided to the Service for review prior to initiation of construction.
4. Riverbank alterations with the project area shall encompass no more than 510 feet of shore line. An approximately 2:1 slope will be established. The area of the bank from the NPS to 24 feet above the NPS would then be stabilized with 10 inch rock. The area between the rock and the top of the slope will be vegetated with early successional bottomland herbaceous and woody vegetation. The revegetation plan will be developed in coordination with the Ohio Department of Natural Resources and the Service.
5. A barge approach and departure plan shall be developed in coordination with the Ohio Department of Natural Resources and the Service that outlines the anticipated route of barge travel to and from the facility. This route should avoid to the maximum extent possible, travel over the upstream portion of the unionid bed. Approaching and departing barges should comply with the plan.
6. No initial or maintenance dredging shall be conducted within the project area.
7. Mooring cells must be removed after the onshore area is mined, at an estimated time of 30 years, unless after consultation with the Ohio Department of Natural Resources and the Service, it is determined that this action will have an adverse impact on the unionid bed or is otherwise unfeasible.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, the Corps must comply with the following terms and conditions which implement the reasonable and prudent measures and outline reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. Develop and implement a mussel monitoring plan capable of detecting community structure changes, as defined in the incidental take statement, within the mussel population in the affected bed. The monitoring plan should be developed by a reputable malacologist in coordination with the Service, West Virginia Division of Natural Resources, and the Ohio Department of Natural resources. This would include establishment of a “before project” baseline. Existing data maybe used as appropriate to establish this baseline. After establishment of the baseline, monitoring should continue throughout the life of the project or until it is determined, after

consultation and concurrence with the Service, that such monitoring is no longer necessary.

2. Changes discovered in the community structure of the mussel population in the affected bed as a result of the monitoring plan will be compared to the "Level of Take" criteria. Should any of these criteria be exceeded, a reevaluation of the project impacts on C. stegaria will be triggered. Reinitiation of consultation may result.
3. If the Corps determines that the monitoring period required by these terms and conditions exceeds the Corps permit authority, the Corps should: 1) provide the applicant with a copy of this biological opinion; and 2) notify him/her that the terms and conditions must be adopted by the applicant in order for the applicant to be exempt from the provisions of section 9 should incidental take occur. In addition, the applicant should be notified that if these terms and conditions are not implemented, any incidental take that results from the activities considered in the biological opinion would be prohibited by section 9 and, therefore, the applicant should contact this office to apply for an incidental take permit under Section 10(a)(1)(B).

The reasonable and prudent measures, and implementing terms and conditions, are designed to minimize the impacts of the incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that the anticipated level of take, as described above, will not be exceeded. However, if during the course of the action, this level of take is exceeded, consultation with this office must be reinitiated.

Reinitiation of Formal Consultation

This concludes formal consultation on the action outlined in the Corps' request. As required by 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such a take must cease pending reinitiation.

The Service appreciates the opportunity to work with the District in fulfilling our mutual responsibilities under the Endangered Species Act. Please contact Barbara Douglas or William Tolin at or West Virginia Field Office at (304) 636-6586, if you have any questions regarding this matter.

Sincerely,

Jeffrey K. Towner
Field Supervisor

Literature Cited

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cc:

WVDNR - Dower

PAFO - Densmore

ORINWR - Morrison

USEPA - Rider

ODNR - Shearer