

LAKE DELHI TASK FORCE
ENVIRONMENT SUBCOMMITTEE REPORT

ENVIRONMENT ASSESSMENT REPORT

ENVIRONMENT FUNDAMENTALS
DAM CONSIDERATIONS
RIVER CONSIDERATIONS

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ENVIRONMENT FUNDAMENTALS

STRUCTURAL ASSESSMENT

Iowa Administrative Code (IAC) 567-73.10 states that the abandonment of a dam, or the intent to permanently cease or cause to cease all acts of construction, operation, and maintenance of a dam, is prohibited. If any person wishes to be relieved of the responsibilities inherent in the ownership or control of a dam structure, those responsibilities shall be undertaken by another person through sale, transfer or other means, or the dam shall be removed.

To request approval to remove a dam the applicant shall submit a written statement including the following:

- (1) Identification of the structure by name and location.
- (2) Identification of the owner and, if the applicant is not the owner, evidence of authority to act for the owner.
- (3) The purpose for removal of the dam.
- (4) Methods to be used in drainage of the impoundment and removal of the structure and appurtenances.
- (5) Proposed final disposition of the impoundment site.
- (6) Names, mailing addresses and location of the immediate upstream, downstream and adjacent landowners and occupants and, in addition, names and mailing addresses of other landowners and occupants who the director or council, after reviewing the proposal, believes will have a substantial interest in or will be substantially affected by removal of the dam.

WASTEWATER

Prior to the dam failure, Lake Delhi was a high priority on the Department's unsewered communities list. Nearly half of the 400 homes or cabins surrounding the lake are currently considered to be unsewered. Therefore, homes are discharging untreated or partially treated wastewater to groundwater and/or surface waters. The Department understands that the county had begun to address this issue; however there has been no action for two years.

Because the communities are not in compliance with the Clean Water Act, as homes are rebuilt, it is a good time to address the necessary wastewater improvements.

Requirements

If private sewage disposal systems are proposed to treat wastewater (4 homes or fewer on one system or a daily flow of 1500 gallons or less), a construction permit is required from the county and the system must comply with 567 IAC Chapter 69, "Private Sewage Disposal Systems." If homeowners use a private discharging system, a NPDES General Permit #4 for the effluent is required.

If the system is larger than a private system, homeowners are required to submit a plan to the DNR's Wastewater Engineering section for approval. An engineer licensed in the state of Iowa must put the plan together.

A public system requires an individual NPDES permit if it is a discharging system. The requirements for that permit are based on the system type, size, and the receiving stream. Since Lake Delhi is classified as a stream,

it's unlikely that the presence or absence of a dam would affect the standards for a NPDES permit. If homeowners use a public system that does not discharge, the Department would likely require an operation permit. The rules for public systems are found at IAC 567 Chapters 60 through 64.

Considerations

The time of transfer bill will help address some of the septic issues. This rule requires a homeowner to upgrade, fix or install the proper septic system before the sale of a home.

The Department is concerned that assessments of wastewater on properties that are abandoned may be needed.

The Department needs to conduct an internal review of the water bodies' classification and uses, laws and contracts in order to ensure that all water quality standards are met.

Recommendations

Clustered onsite systems and individual septic systems should be considered as a viable option.

WATER SUPPLY

The development of a public water supply would improve the Lake Delhi area and it would also serve as a long term solution for the community. It would allow access to managed water and provide a trail of accountability to meet drinking water standards. A public water supply may also meet the financial needs of many in the community who are unable to afford separate water supply wells. This would also help address wastewater issues in this area in respect to separation distances from wells. See an overview of requirements in the Appendix.

Considerations

As a short term solution – installation or rehabilitation of private drinking water wells could be an option. However, many of the building lots in the community will not support both a private well and a private septic system and still meet the setback requirements. The cost involved with the new wells and upgrades may be cost prohibitive to many property owners.

Recommendations

Community Development Block Grants and State Revolving Loan Funds may be available for a drinking water and wastewater treatment system.

FLOOD PLAIN

Requirements

Damaged buildings located in the 100 year flood plain require a flood plain permit to repair if costs exceed 50% of the building's (pre-damage) market value.

Any person who desires to construct or maintain a structure, dam, obstruction, deposit or excavation, or allow the same in any flood plain or floodway has a responsibility to contact the Department to determine whether Department approval is required. Minimum statewide criteria for most types of flood plain development are listed in 567-IAC 72 and 567 IAC 70.1 (Iowa Code Chapter §455B, 481A).

Considerations

Recommendations

STREAM CHANNEL CONDITIONS

The current condition of streambed and banks upstream of the breached dam and downstream is unacceptable. The initial breach released a sudden deposition of fine sediments across the floodplain that inundated homes, businesses, and public parks. Head cutting continues at approximately 150 feet per day up the dry lakebed. This has released approximately 180,000 cubic yards (or, 18,000 dump-truck loads) of silt to the river. This silt is moving downstream. Because Maquoketa River is at a low flow, silt is likely to be accumulating in channel pools and reducing rocky habitat. Eventually, as the river cuts into deeper accumulations of silt in the former lakebed, accumulations downstream could raise the entire bed of the river, leaving it with little or no defined channel. Flooding impacts on various streams and downstream communities could be serious.

Requirements

Federal and state permits (e.g. Flood Plain Permit for stream bank stabilization and 404 permit) are required prior to stream bank stabilization projects.

A Storm Water Construction General Permit #2 may be required for any significant projects. This would include constructing accesses to accomplish temporary and permanent construction activities.

Considerations

Consult with United State Geological Survey (USGS), US Army Corp of Engineers, NRCS and other experts in sediment stabilization.

USGS has offered a more detailed analysis of sediment transport through the system, data which will be valuable in consideration of all future scenarios, from lake dredging to river rehabilitation.

Recommendations

Additional analysis of sedimentation should be conducted – assessment and monitoring quantity of soil loss and water quality. It is important to know exactly what the Department is dealing with below the old lake bed – thickness and quantity of lake sediment, natural sediment, and the top of bedrock.

Note: An effort to accomplish emergency channel stabilization is currently in the planning stages. (9-24-2010)

AQUATIC HABITAT

Aquatic habitat is degraded by the deposition of excess levels of sediment. Sedimentation degrades water quality, can increase stream temperatures, covers aquatic habitat on the streambed, and is particularly damaging to filter-feeders such as mussels. In addition, silts mobilized by the head cut at low flows have fallen out of the water column downstream, covering the riverbed and possibly filling deepwater pools. This, in turn, may have buried and destroyed mussel beds and benthic macro-invertebrate communities that depend on interstitial space between pebbles.

Aquatic habitat assessment, biological impact assessment, and water quality assessment will continue through this fall. Water quality monitoring and initial observations suggest negative impacts are most acute in the lower basin of Lake Delhi and the Maquoketa River from the dam site to Monticello.

A 5-mile long section of the Maquoketa River immediately downstream of the Delhi Dam was a specially designated smallmouth fishery with an abundance of rocky stream habitat. Past scientific surveys of mussels included four Species of Greatest Conservation Need: the creek heelsplitter, elktoe, ellipse, and slippershell.

Requirements

Unrelated to the issue of dam re-construction, stabilization in the form of grade control structures at and above the dam breach and upstream are needed immediately to stop the head cut. (See above).

Eventually, a plan for remediation and restoration of both habitat and species may need to be considered downstream and/or upstream.

Plans, appropriate funding, and all associated permits would be needed.

Fish passage requirements must be implemented as stated in Iowa Code §481A.14.

Considerations

Stream bank restoration offers an opportunity to create habitat for additional riparian species such as birds, reptiles, and amphibians, in addition to in-stream species such as fish and mussels. (See for example the Driftless Riparian Habitat Guide published by NRCS and Trout Unlimited.)

Biological assessment is a long-term and ongoing process. Assessment of the full impact of current conditions and effectiveness of any mitigation measures will require long-term monitoring.

United State Geological Survey has offered a more detailed analysis of sediment transport through the system, data which will be valuable in consideration of all future scenarios, from lake dredging to river rehabilitation.

Recommendations

PUBLIC SAFETY/RECREATION

Portions of the river are still dangerous to boaters, therefore the Department recommends no recreational use of the river. Tree limbs, household items and other debris are still being removed.

Downstream, canoe livery businesses have complained about the rental season both by the initial breach and release of sediments, and the ongoing siltation and clean-up of debris. Boat launches have become difficult to maintain and parks have ongoing siltation issues. EPA is currently locating and implementing removal of “orphan” tanks and drums that may be hazardous.

Requirements

Considerations

Safe and legal portaging around the failed dam will continue to be a concern.

Recommendations

OTHER PERMITS/REQUIREMENTS

Dependent upon the type of work conducted near the river bank the following permits may be required:

- State: Sovereign Lands requirements, 571 IAC 13, Iowa Code Chapter §455A, §461A, §462A
- Federal: USACE section 404 permit; stream mitigation rule
- Federal: Environmental Assessment or (EIS)

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DAM CONSIDERATIONS

STRUCTURAL ASSESSMENT

The first question to address is, what is the main purpose of the dam? Is it flood control, recreation, hydro-electric power generation, or another use? Knowing the purpose and planning for it, is key in understanding what requirements, permits and components need to be considered.

Requirements

A new dam would be classified as High Hazard because failure may create a serious threat of loss of human life or result in serious damage to residential, industrial or commercial areas. 567 IAC 72.3(1) "a".

(This list only highlights some of the main requirements. All referenced rules need to be followed in their entirety.):

- The specified freeboard design flood for high hazard dams is the probable maximum flood. This represents the greatest flood the dam must be designed to accommodate. The flood must be passed without overtopping of the dam and endangering its safety or the dam must be designed to withstand such overflow.
- High Hazard dams must have the capacity to pass a 100 year flood by the principal spillway without need for operation of an emergency spillway. Dams that have emergency spillways constructed of structural concrete or which are excavated into sound rock, a lower principal spillway design flood may be permitted if flood control or dam safety would not be adversely affected.
- Soils and foundation investigation must be completed.
- Anticipated sedimentation rates and their impact on the life and usefulness of the impoundment shall be investigated.
- A written operating plan shall be prepared for any dam with gates or other moveable structures which must operate or be operated during times of flood or to provide a minimum downstream release rate.
- A gated low level outlet shall be provided which is capable of draining at least 50 percent of the permanent storage behind the dam within a reasonable length of time.
- Dam breach analysis must be completed.
- The development of a comprehensive Emergency Action Plan is strongly encouraged.

Hydro-Electric Dam

In addition to the applicable requirements above:

- A feasibility and cost analysis should be completed if hydro-electric is used.
- Iowa Code Chapter 469A requires a certification of convenience and necessity by the Executive Council of Iowa. Because the prior hydroelectric dam predated this law, no prior certificate is expected to exist. Therefore, the certificate must be obtained before a hydro-electric dam could be constructed. The Council is required to adopt rules but has not yet done so.
- There may be generation siting requirements pursuant to Iowa Utilities Board requirements.
- Review of FERC regulations

Considerations

Environmental Review should be taken into consideration.

If hydroelectric proves feasible, it could potentially help pay for the maintenance and operation of the dam.

Recommendations

WASTEWATER

Design of the wastewater collection & treatment system, particularly the collection system, will be dependent upon the elevation of the pool behind the dam. If the pool elevation is the same as it was prior to the dam failure, collection system options will be limited.

Requirements

See Wastewater under Environment Fundamentals.

Considerations

Impacts to existing septic systems must be considered.

Recommendations

WATER SUPPLY

Requirements

Water storage allocation permit is required.

See Water Supply under Environment Fundamentals.

Considerations

The impounded lake water increases the saturated thickness of the sand aquifer making shallow well placement an option.

Recommendations

FLOOD PLAIN

Requirements

Pertains to buildings and associated fill adjacent to an impoundment or downstream from a dam.

- A Flood Plain Permit is required for a building and associated fill adjacent to an impoundment if the lowest floor level including any basement is lower than the top of the dam. 567 IAC 71.7(4) “a.” Buildings adjacent to an impoundment shall be protected to the elevation of the top of the dam unless the dam has adequate spillway capacity to discharge the flood corresponding to the damage potential of the building at an elevation below the top of the dam. 567 IAC 72.5 (1) “d”. Note: Without confirmed information regarding a future dam design, DNR’s current flood permit models upstream of Lake Delhi Dam use the 2010 flood level plus one foot. Downstream modeling has yet to be completed. (9-24-2010). Plans are subject to change with additional information.

- A Flood Plain Permit is required for a building and associated fill downstream from a dam at any location where flooding can be reasonably anticipated from principal or emergency spillway discharges. If the dam does not substantially comply with high hazard criteria in these rules, approval is required for a building and associated fill at any location where flooding can be reasonably anticipated from overtopping and failure of the dam. 567 IAC 71.7(4) “b.” Buildings downstream

from a dam shall be protected to a level established by the Department after due consideration of the hazards posed by the dam for buildings downstream. 567 IAC 72.5 (1) “e”.

See Flood Plain under Environment Fundamentals.

Considerations

Recommendations

STREAM CHANNEL CONDITIONS

The lake will again begin to intercept sediments from the lakebed and normal sediments from upstream. The downstream channel will likely take years, perhaps decades to reach stability due to volumes of sediments stored in the channel.

Requirements

Unrelated to the issue of dam re-construction, stabilization in the form of grade control structures at and above the dam breach and upstream are needed immediately to stop the head cut.

Eventually, a plan for remediation and restoration of both habitat and species may need considered downstream and / or upstream.

Considerations

United States Geological Survey has offered a more detailed analysis of sediment transport through the Maquoketa River system and the Delhi lakebed, data which will be valuable in consideration of all future scenarios, from lake dredging to river rehabilitation.

Recommendations

See Stream Channel Conditions under Environment Fundamentals.

AQUATIC HABITAT

Restoring the lake to pre-flood conditions would re-establish Lake Delhi and the fishery that it supports. Dams affect aquatic habitat in multiple ways. These impacts can be both negative and positive and include the following: sediment retention, sedimentation, changes in water quality, and habitat fragmentation.

Present fish access to the upper river may be important to the overall Maquoketa River ecosystem in providing refuge areas, as the siltation inundates habitat downstream. Fish passage should also be carefully considered in all phases of addressing the Lake Delhi dam breach.

Requirements

Fish passage requirements must be implemented as stated in Iowa Code §481A.14.

Considerations

The dam design should consider fish passage, fish entrainment, fish impingement and water quality impacts. “Run of River” operations are preferred for aquatic habitat and recreation above and below dam facilities.

Recommendations

PUBLIC SAFETY & RECREATION

Rebuilding the dam would return the lake to pre-flood conditions; it would re-establish the value of the lake homes and restore recreation for larger vessels. A reconstructed road may allow emergency service vehicles to better protect the citizens in the area.

Prior to the breach, public access to Lake Delhi was limited, but possible. To date public investment has supported dredging and maintenance. Iowa Code Chapter 462A “Water Navigation Regulations” applies to Lake Delhi.

Requirements

Considerations

If additional public investment in the Lake Delhi Dam occurs, it is reasonable to expect the public may demand broader access potentially including accommodations for navigation, parks, beaches, and/or portage in the vicinity of the dam.

Funding for water patrol will continue to be necessary from a safety standpoint and enforcement of the state’s dock rules.

Recommendations

RIVER CONSIDERATIONS

STRUCTURAL ASSESSMENT

Requirements

Approval is needed to remove the remaining dam structure. As noted above, in accordance to 567 IAC 73.10 Abandonment is prohibited.

See Structural Assessment under Environment Fundamentals.

Considerations

Recommendations

WASTEWATER

See Wastewater under Environmental Fundamentals.

WATER SUPPLY

See Water Supply under Environmental Fundamentals.

FLOOD PLAIN

If the dam is not rebuilt, the 100 year flood evaluation upstream of structure would be lower and the potential flood hazard associated with dam failure would be eliminated for those downstream. Assuming that the flood plain evaluation would be lower, fewer residences will have to meet flood plain regulations.

Requirements

See Flood plain under Environmental Fundamentals.

Considerations

Recommendations

STREAM CHANNEL CONDITIONS

Restoring the river to a more natural state has the potential to revive a broader eco-system, restore habitat, species diversity, aesthetic value, and water quality improvements.

Requirements

See Stream bank stabilization under Environment Fundamentals.

Considerations

Upfront costs would be incurred. Any such work would require cooperation from adjacent property owners and such cooperation would be necessary to gain access to portions of the stream.

Recommendations

AQUATIC HABITAT

River impoundments have multiple aquatic habitat challenges because sediment transport is disrupted. Open river systems convey sediment and water and benefit from increased habitat complexity and improved water quality.

Requirements

See Aquatic Habitat under Environment Fundamentals.

Considerations

Water quality conditions in the lower lake basin will not improve in the near-term and this will impact aquatic life in downstream sections of the river. Over time, water quality and habitat should improve in downstream areas, but the time it will take for this improvement to occur is unknown.

Most native Maquoketa River species (e.g. smallmouth bass, freshwater mussels) benefit from aquatic habitat conditions that are “riverine”. Generalist species (e.g. channel catfish, common carp, green sunfish) typically thrive in river impoundments.

Recommendations

PUBLIC SAFETY & RECREATION

Any stream rehabilitation plan should consider public safety and recreation, including both angling and river navigation.

Requirements

Considerations

Recreational opportunities would change significantly. Paddle craft, smaller fishing vessels, and wildlife viewing would become more prevalent, while lake-based activities like ice fishing, PWC use, recreational power boating, and waterskiing would disappear.

A stream rehabilitation plan should be developed to identify long-term issues and approaches in both the lake bed and the downstream channel.

Recommendations

BRIDGE OPTION

A bridge crossing over the river would allow emergency services to better protect the citizens in the area and should incorporate public access of Lake Delhi if feasible.

The bridge should allow for safe passage of water craft and should not significantly alter stream geomorphology and physical attributes.

Requirements

Sovereign Lands construction permit is needed if a bridge is constructed.

Flood Plain Permit would be needed. 567IAC 71.1(455B) Bridges, culverts, temporary stream crossings, and road embankments.

Considerations

A bridge crossing would have a significant cost.

Assuming the bridge is built to the Department's standards water quality would be affected by road salt and car emissions.

Recommendations

APPENDIX

Water Supply Requirements Brief Overview

(These lists only highlight some of the main requirements. All referenced rules need to be followed in their entirety.):

- Public Water Supplies – Note – The construction and operation of a public water supply well and distribution system involves many documented steps and reviews to ensure standards are followed and the drinking water supplied to the public meets EPA and Iowa DNR standards. Highlights include:
 - a. Well Site Location - Any public water supply well location must meet all Department site review criteria including setbacks from potential contamination and legal control of the property for a radius of 200 feet from the well head. Setbacks are found in 567 IAC Chapter 43 table “A”.
 - b. Well Construction Permit Application Process - The well owner must submit proper permit application documentation and fees to the Department. (567 IAC Chapter 43.3(3))
 - c. Permit to Operate – All public water supply wells must obtain an Operation Permit through the Department.
 - d. Annual Water Supply Fee (567 IAC 43.2)
 - e. Operator Certification (567 IAC 43.1(5) and 81)
- Private Water Wells
 - a. All private water supply wells must be permitted by the Department or a local permitting authority authorized by the Department (567 IAC 38.3.) Well Construction Permit Application Process - The well owner must submit proper permit application documentation and fees to the local private well permitting authority (local county environmental health offices.) (567 IAC 38.3(3) and (4))
 - b. Application Fees (567 IAC 38.5)
 - c. All Construction permits are issued with conditions (567 IAC 38.8)
 - d. All private water wells must meet all Department private well site review criteria including setbacks from sources of potential contamination. (567 IAC 49 table “A”) All variances to setbacks must be defined to include an increase in the well construction standards applied during the well’s construction.
 - e. Drinking water testing is required for all newly constructed wells, renovated or rehabilitated wells, or serviced wells, within 30 days of well activity.
 - f. Yearly water testing is strongly recommended but not required by current Iowa law or Administrative Code.

Other Pertinent Rules:

- Well construction sites may require well construction wastewater treatment and monitoring as found in the Department’s General Permit #6. (567 IAC 64.4)
 - If a community water supply is developed or if an existing community water supply is used to serve the lake region, additional requirements may be placed on the water supply.
 - Certified Well Contractor Requirement – Anyone performing the well services for a public or private well, other than their own private household well, must be a well contractor who is certified by the Department for all services which are provided.
- Well construction documentation must be submitted to the Department as required for both private and public water supply well construction activities.