Chapter 8. Flood Control

Flood control projects have traditionally been used by communities to control or manage floodwaters. They are also known as "structural" projects that keep floodwaters away from an area as opposed to "non-structural" projects, like retrofitting, that do not rely on structures to control flows. Flood control projects are usually designed by engineers and managed or maintained by public works staff.

Six issues related to managing floodwaters are reviewed in this chapter:

- Levees and floodwalls
- Dams and reservoirs
- Channel improvements
- Sedimentation
- Ice jam prevention
- Drainage system maintenance

These projects have some advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings.
- Many projects can be built without disrupting homes and businesses.
- They can be used to further other community objectives, such as water supply and recreation.
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, they also have shortcomings.

- They disturb the land and disrupt natural water flows, often destroying wildlife habitat.
- They require regular maintenance, which if neglected, can have disastrous consequences.
- They are built to a certain flood protection level that can be exceeded by larger floods, causing extensive damage.
- They can create a false sense of security as people protected by a project often believe that no flood can ever reach them.
- They may promote more intensive land use and development in the floodplain.

Some channel improvements can be very damaging to the environment and may pass a flooding problem on to downstream properties

8.1. Flood Control Studies

Since structural flood control is generally the most expensive type of mitigation measure in terms of installation costs, maintenance requirements and environmental impacts. Larger projects have regional or watershed-wide implications. Therefore, a thorough assessment of alternatives needs to be conducted before choosing a project, a process that can be time consuming and expensive.

Because of these factors, flood control projects are often planned, funded and implemented at a regional level by state or federal agencies, such as the Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR), the U.S. Army Corps of Engineers, and the USDA Natural Resources Conservation Service.

Over the years, flood control studies have been conducted on the larger streams in Kankakee County. In most cases, these studies conclude that a flood control project would be too expensive for the benefits that would result. This was the case for IDNR studies on Bourbonnais and Gar Creeks and on the Iroquois River at Watseka.

A major "Kankakee River Basin Feasibility Study" was authorized by Congress in 1995. It was conducted by the Corps at a cost of $3.5 million, with half the cost picked up by the States of Illinois and Indiana. It concluded

> A basin-wide flood reduction program is not economically justifiable. Analyses of sediment transport and ecosystem restoration opportunities are ongoing. An Interim Report is being prepared that will provide recommendations for sediment reduction/removal and ecosystem restoration. *(www.lrc.usace.army.mil/projects/Kankakee%20GI%20FY05.htm)*

In fact, two restoration projects are being pursued, one channel project in Aroma Park and a wetland expansion at the state line. These may have some auxiliary flood protection benefits, but not enough to be measured as a flood control project.

The Corps and IDNR's predecessor agency, the Department of Transportation, Division of Water Resources, have prepared "reconnaissance" reports. These review the level of a community's flood problem and conclude whether the problem is severe enough to warrant further study for a flood control project. One was published for Grant Park in 1981 that recommended against pursuing a study.

On the other hand, a Corps report for Soldier Creek in 1962 concluded

> That periodic flooding of such severity as to warrant consideration of remedial measures does occur on Soldier Creek. *(Survey Report for Flood Control and Drainage Development, Soldier Creek, Kankakee County, Illinois, 1962, p. 19)*

It took more studies and 25 more years for a Department of Transportation, Division of Water Resources study to recommend the project that is shown on page 8-6.

CRS credit: Structural flood control projects that provide 100-year flood protection and result in revisions to the Flood Insurance Rate Map are not credited by the Community Rating System in order to not duplicate the larger premium reduction provided by removing properties from the mapped floodplain. The CRS does credit flood control projects that result in revisions to the 100-year floodplain map. It does credit projects that meet the following criteria:

- They must provide protection to at least the 25-year flood.
- The design and construction must be certified by a licensed professional engineer.
- They must meet certain environmental protection criteria.
- They must meet Federal, State and local regulations, such as Corps of Engineers' 404 permit and State dam safety rules requirements.
- They must meet certain maintenance requirements.

These criteria ensure that credited projects are well-planned and permitted and address the concerns and shortcomings listed on page 8-1. If they meet the above criteria, levees, floodwalls, reservoirs and channel improvements would be recognized under Section 531 of the *CRS Coordinator's Manual*. Credit points are based on the type of project, how many buildings are protected, and to what flood protection level.

8.2. Levees and Floodwalls

Probably the best known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Key considerations when evaluating use of a levee include:

- Compensating for the floodwater storage that will be displaced by the levee,
- Internal drainage of surface flows from the area inside the levee,
- Cost of construction,
- Cost of maintenance,
- River access and views, and
- Creating a false sense of security.

This last item has been a major concern of state and federal agencies. While levees may reduce flood damage for smaller more frequent rain events, they may also overtop or breach in extreme flood events and subsequently create more flood damage than would have occurred without the levee. This was the vividly illustrated during the Great Flood of 1993.

Levee failure, 1993 Missouri River flood

US Army Corps of Engineers

Levees placed along the river or stream edge degrade the aquatic habitat and water quality of the stream. They also are more likely to push floodwater onto other properties upstream or downstream. To reduce environmental impacts and provide multiple use benefits a setback levee (set back from the floodway) is the best project design. The area inside a setback levee can provide open space for recreational purposes and provide access sites to the river or stream.

Floodwalls perform like levees except they are vertical-sided structures that require less surface area for construction. Floodwalls are constructed of reinforced concrete, which makes the expense of installation cost prohibitive in many circumstances.

Small floodwall on the Little Calumet River

Local implementation: There are no formal levee or floodwall systems in Kankakee County. The elongated development pattern along the larger rivers is such that it would take a long levee system to protect a relatively small number of properties, so the benefits would not be worth the cost.

CRS credit: Up to 900 points are provided if a community has a levee system that does not provide 100-year flood protection, but is publicly maintained and subject to a special levee safety program. However, there are no such levees in Kankakee County.

8.3. Dams and Reservoirs

Reservoirs reduce flooding by temporarily storing floodwaters behind dams or in storage or detention basins. Reservoirs lower the flood height by holding back, or detaining, runoff before it can flow downstream. Floodwaters are detained until the flood has subsided, then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Off-stream reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could help mitigate a drought).

Dams and reservoirs protect the development that is downstream from the reservoir site. Unlike levees and channel modifications, they do not have be built close to or disrupt the area to be protected. Reservoirs are most efficient in deeper valleys where there is more room to store water, or on smaller rivers where there is less water to store.

In urban areas, some reservoirs are simply manmade holes, excavated to store floodwaters. In some areas, costs have been reduced by using abandoned quarries as reservoirs. Reservoirs in urban areas are typically constructed adjacent to streams (though usually outside of the floodplain). When built in the ground, there is no dam for these retention and detention basins and no dam failure hazard. Wet or dry basins can also serve multiple uses by doubling as parks or other open space uses.

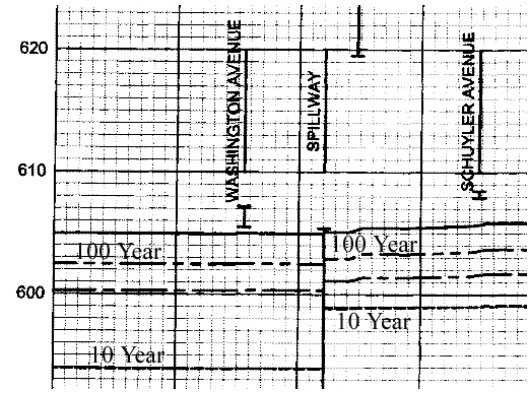
There are several considerations when evaluating the use of dams and reservoirs:

- There is the threat of flooding the protected area should the dam fail.
- There is a constant expense for management and maintenance of the facility.
- They may fail to prevent floods that exceed their design levels.
- Sediment deposition may occur and reduce the storage capacity over time.
- They can impact water quality as they are known to affect temperature, dissolved oxygen and nitrogen, and nutrients.
- If not designed correctly, they may cause backwater flooding problems upstream.

Local implementation: The City of Kankakee owns a dam in the Kankakee River at Washington Avenue. It was not built for flood control, but to provide hydroelectric power. As a side benefit, it keeps the water level up during low flow periods so boats can use the river upstream of the dam.

Kankakee River dam at Kankakee

To the right is a "profile" which presents a side view of the Kankakee River. The River flows downhill from right to left. The dam is the vertical line in the middle. Upstream (to the right) of the dam, the 10 year flood is five feet higher, i.e., low flows are raised. However, higher flows, like the 100-year flood, flow over the dam with little impact on flood heights. This also means there is little threat of extra flooding if the dam failed during high flows.



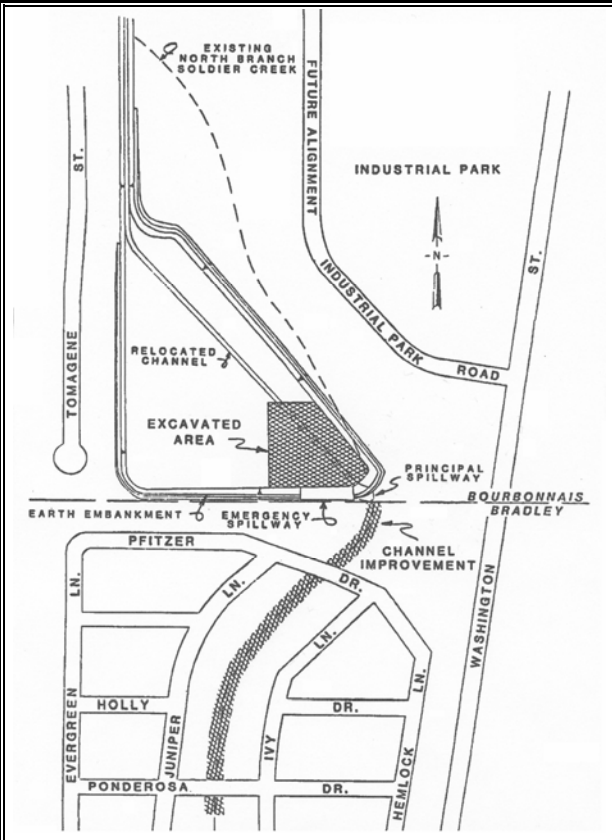
Kankakee River profile

Kankakee City Flood Insurance Study

There is another dam in the Kankakee River in Momence, on the channel on the north side of the island. It was built in the 1930's to raise the river level to create the island. As with the Washington Avenue dam, it has no flood control benefit. There is enough capacity in the main channel to carry flood flows around the dam.

The only major flood control reservoir in Kankakee County is the detention basin on the North Branch of Soldier Creek in Bourbonnais. It is illustrated below.

CRS credit: There are no flood control benefits from the Kankakee River dams. The North Branch Soldier Creek reservoir reduced the floodplain enough to warrant a new Flood Insurance Rate Map, so there is no credit for this project under the Community Rating System.



Strategic Planning Study, IDOT/DWR, 1988

Kankakee County Planning Department

The product of a joint effort by the City of Bradley and the Illinois Department of Transportation, Division of Water Resources, the project was completed in the early 1990's.

The project includes both a reservoir and downstream channel improvements. It lowers the 100-year flood level by up to 1.7 feet, which was calculated to produce average savings of over $40,000 in reduced flood damage each year. While located in Bourbonnais, the main beneficiary is Bradley, which is downstream.

North Branch Soldier Creek Reservoir and Channel Improvement

[The industrial park road is now Ernest Mooney Drive.]

8.4. Channel Improvements

By improving a channel's conveyance, more water is carried away at a faster rate. Four types of channel improvements are reviewed here:

- Channelization, i.e., making the channel wider, straighter or smoother,
- Diversion of high flows to another channel or body of water, and
- Improving crossings, bridges, and roadways.

Channelization: Straightening, deepening and/or widening a stream or river channel (illustrated on page 8-1), has traditionally been the common remedy for local drainage or flooding problems. Here are the concerns with this approach that need to be kept in mind:

- Channelized streams can create or worsen flooding problems downstream as larger volumes of water are transported at a faster rate.
- Channelized streams rise and fall faster. During dry periods the water level in the channel is lower than it used to be, creating water quality and habitat problems.
- Channelized waterways tend to be unstable and experience more streambank erosion. The need for periodic reconstruction and silt removal becomes cyclic, making channel maintenance very expensive.

On the other hand, properly sloped and planted channel banks are more aesthetically and environmentally appealing, and can prove cheaper to maintain than concrete ditches. A combination of vegetated swales, infiltration trenches and other best management practices will increase infiltration, reduce runoff and improve water quality. As shown in the photos below, these projects can have multiple benefits.

Channel improvements do not have to result in concrete or rock banks. They can include measures to improve infiltration and water quality.

Diversions: A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Diversions are limited by topography; they will not work in some areas. Unless the receiving water body is relatively close to the floodprone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive. Where topography and land use are not favorable, a more expensive tunnel is needed.

Channel crossings: In some areas, roads and bridges are flooded during heavy rains. While buildings may not be damaged, residents, customers, commuters, and emergency

vehicles may not be able to get through. A common safety hazard occurs when people try to drive through flooded streets or assume that a bridge that is underwater is still there. As noted on page 3-5, floods kill more people trapped in vehicles than anywhere else.

Another concern is when a small culvert or bridge opening constricts flows and causes localized backwater flooding. The common solution to these problems is to raise the roadbed and enlarge the culvert or bridge opening. However, designers need to consider the potential for a raised road acting as a dam, flooding people upstream and larger openings allowing more water downstream. Plans need to ensure that the projects do not worsen flooding on someone else.

Local implementation: The network of drainage ditches throughout the County is a product of channelization, but it was built in the first half of the 20th Century, without today's environmental protection restrictions. There was some channelization work as part of the North Branch Soldier Creek project (see page 8-6). There were no reports of diversion projects in the County.

In response to the municipal survey of mitigation measures, Herscher and Manteno identified bridges and other road crossings that impede or obstruct flows. Herscher's was fixed with the reconstruction of the state highway bridge over Horse Creek.

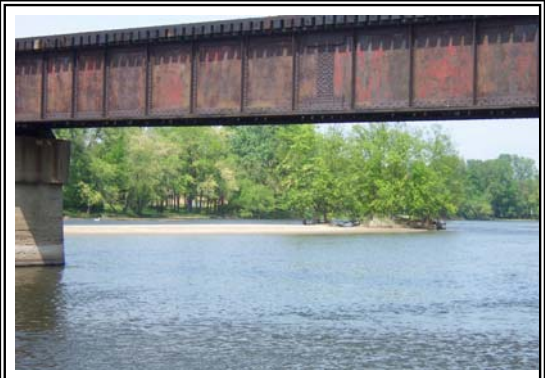
Manteno, the fastest growing municipality in the County, has several bridges and culverts that are now too small for the amount of water that is conveyed in the ditches. Two of them go under state highways. The Village also has a road that is covered by water when Rock Creek floods.

8.5. Sedimentation

Sedimentation is the deposit of sand and silt in the channel. The sand and silt come from two main sauces: upstream riverbanks and farms and construction sites in the watershed. Sedimentation raises the channel bottom and forms sand bars and islands. As a result, there is less room in the channel to carry higher flows. There are two ways to deal with sedimentation: dredge the channel and control the erosion.

Dredging: Dredging is the most common way to remove sediment. However, it has the following problems:

- Dredging is often cost prohibitive because the dredged material must be disposed of somewhere.
- Given the large volume of overbank floodwaters, removing a foot or two from the bottom of the channel will have little effect on large floods.



Kankakee River sand bar upstream of the railroad bridge, Aroma Park

- Unless upstream erosion is stopped, the dredged areas usually fill back in within a few years, and the process and expense have to be repeated.
- If the channel has not been disturbed for many years, dredging will destroy the habitat that has developed.
- To protect the natural values of the stream, Federal law requires a Corps of Engineers permit before dredging can proceed. This can be a lengthy process that requires much advance planning and many safeguards to protect habitat.

Dredging

Accordingly, dredging is usually not an effective or efficient flood control approach. It is usually limited to clearing channels needed for navigation and low flow drainage.

Erosion control: The sediment in the channel comes from upstream erosion of construction sites, farm land, and channel banks. Construction sites can be regulated and, as noted in section 5.6, the new model stormwater management ordinance has improved provisions.

Farm land is harder to regulate. Instead, the main approach is to show farmers soil conservation practices that can save them both their land and farming costs. This is one of the main goals of the Natural Resources Conservation Service and local soil and water conservation districts.

Eroding channel banks can be retrofitted with rock ("rip rap"), concrete, steel, or appropriate planting. "Stream conservation," "bioengineering" or "riparian corridor restoration" are different terms for the same objective: return streams, streambanks and adjacent land to a more natural condition, including the natural meanders. A key component of these efforts is to use appropriate native plantings along the banks that resist erosion.

Local implementation: Sedimentation in the Kankakee and Iroquois Rivers has been a concern facing different groups, including boaters, fishers, farmers who use river water for irrigation, and emergency managers. It is estimated that in some areas, up to 30% of the channel has been filled in. A 2001 study by the Illinois State Water Survey found that the channel along the "Six-Mile Pool" between Aroma Park and the Kankakee dam has lost 13.4% of its capacity since 1980 due to sediment deposition.

The Flood Insurance Study for the City of Kankakee shows the channel bottom upstream of the dam to be over 20 feet higher than the channel bottom downstream of the dam. While a dam certainly catches sediment, most of the problem may be traced to upstream changes to the natural regime of the river. The Corps of Engineers reports

> Originally, the Kankakee River meandered through some 2,000 bends over a 240-mile course. Limestone outcrops in the stream channel near Momence, Illinois, acted as a natural dam and created a vast marsh in Indiana. The Grand Marsh, or Kankakee Marsh, extended upstream of Momence to South Bend, Indiana, and covered some 500,000 acres, most of which was in Indiana.
>
> The Indiana portion of the Kankakee River was channelized in the late 1800's to early 1900's. The limestone outcrop near Momence was lowered 2½ feet in 1893. The poorly defined tributaries were also channelized [by drainage districts working to drain soggy farmland]. These changes drained a significant portion of the marsh, allowed agricultural production, and resulted in significant hydrologic changes….
>
> … the reach between Aroma Park and Singleton Ditch [two miles upstream of Momence] experienced sediment deposition between 1966 and 1977, but has been fairly stable since 1977. The steep slope and rocky substrate are likely responsible for reduced sediment deposition in this reach. While absolute values of sediment deposition are small, some areas of the reach have been accumulating sediment. Some scour is evident in other parts.
>
> The Six Mile Pool downstream of this reach has filled with trapped sand at a rate of about 0.67 percent per year since 1980…. The upstream reach from Singleton Ditch to State Line Bridge is also losing capacity….
>
> It is expected that sedimentation will continue in the Illinois portion of the Kankakee River. While studies and projects currently underway will begin to address sedimentation entering the Illinois reach of the Kankakee River, additional efforts are needed.
>
> Sedimentation of key aquatic habitats is expected to continue. Side channel and pool areas are expected to continue to lose depth. The interstitial spaces between cobble and gravel substrates may become clogged with sediment. Overall, the high quality habitat of the Kankakee River is expected to decline due to sediment deposition. (Corps of Engineers' *Fact Sheet*, pages 4 – 6)

Measurements of erosion loss show that relatively little of the sedimentation is being washed down from the flat terrain in Kankakee County. In fact, the County was one of the first to reach the "T by 2000" soil erosion goal of the US Department of Agriculture. It appears that a lot of the sediment comes from the rolling land in Iroquois County and from Indiana. The Water Survey report notes that a substantial sand bar forms at the State Line Bridge. It may also be that much of the sediment is from channel erosion and is simply moving from one place to another.

The Water Survey report lists three types of alternative measures to manage or reduce the sedimentation in the rivers:

- Reduce bank erosion through measures such as constructing stabilization projects at the most severe sites, recreating meanders, and retrofitting bridge openings.
- Capture or remove the sediment in the channel with traps and in-stream structures that increase velocity (allowing more sediment to be carried downstream). As for removing the sediment at locations such as the Six-Mile Pool and the State Line Bridge, the report notes,

> If the deposited sediment is removed, this area will probably be filled up with sediment requiring removal at 5-, 10-, or 20-year intervals based on the severity of the problem. (page 61)

- Keep erosion in the watershed from reaching the streams through buffer zones, detention ponds, created wetlands, and other best management practices (BMPs).

As noted on page 8-2, the Corps is proceeding with two restoration projects that will address sedimentation at Aroma Park and the State Line. Additionally, the Economic Alliance and Kankakee County has formed The River Roundtable, a local volunteer committee created in 2009, to explore the feasibility of extracting sand and sedimentation from the Kankakee River. Currently they are seeking funding for a pilot project near Aroma Park in the six mile pool.

CRS credit: There is no Community Rating System credit for sediment management programs or projects.

8.6. Ice Jam Prevention

As noted in Section 2.1, historically, the most common cause of the largest floods on the Kankakee River has been ice jams. Ice forms on top of the river during the coldest winter months. In late winter, it breaks up due to warmer temperatures and increased flows from rain. Ice jams form when the frozen ice blocks the river or when the broken up ice chunks (floes) collects at a shallow point or bridge.

Many agencies have tried a variety of measures to prevent or remove ice jams. These have included:

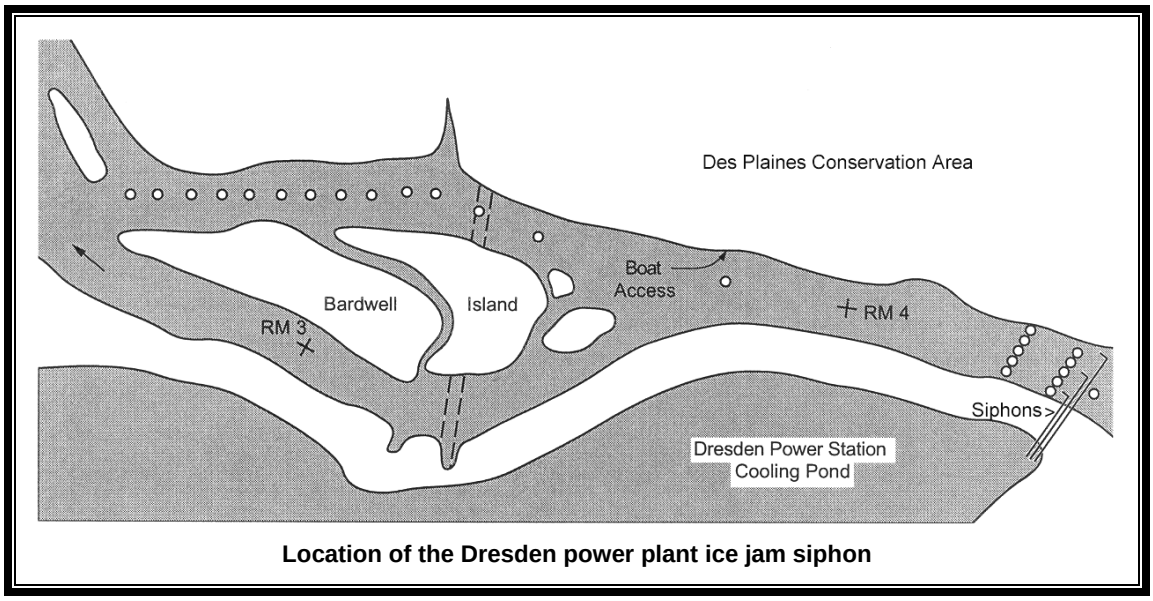
- Ice breaking boats or barges,
- Cutting up the ice with trenching machines,
- Removal by earth moving equipment,
- Breaking ice sheets with an air cushion vehicle,
- Weakening the ice sheet by drilling holes in it,
- Putting piers or booms in the channel to catch the ice upstream of developments,
- Warming the ice surface with black dust, and
- Blasting the jam with explosives.

The Corps of Engineers' Cold Regions Research and Engineering Lab monitors ice jams and ice jam mitigation activities and experiments with different approaches. It concludes that each of these approaches has its pros and cons. For example, earth moving equipment can only be used in shallow areas or from bridges and ice breaking boats need deeper water. One can place explosives in sheet ice, but this is very difficult to do in a moving, building jam.

Local implementation: Several of the methods listed above have been tried on the Kankakee River. In the mid-1980's, IDOT-Water Resources hired a barge which helped break up a jam. The 1982 flood brought additional Corps interest because the ice had damaged the locks at Dresden Island.

In 1987, the Corps tried a demonstration project. A siphon system was installed to pipe water from the cooling pond of the Dresden nuclear power station to the river. The siphon is located four miles upstream of the confluence with the Illinois River, six miles downstream of Wilmington and one mile downstream of Interstate 55.

Three 30" pipes convey 68º water from the cooling pond to the river. In January 1988, the siphon raised the river's water temperature less than one degree in a week. This was enough to open 2.6 miles of the river. Within two weeks of operation, the channel was clear of ice from the siphon outlet to the confluence with the Illinois River.



Location of the Dresden power plant ice jam siphon

The system has been used almost every year since and is no longer considered an experiment. For environmental protection reasons, it cannot be run for more than 14 days or more than two times a year. There is a fish barrier net around the siphon inlet. There have been no reported adverse environmental impacts.

The Will County emergency management office that operates the siphon reports:

> Its exact impact on flood reduction is hard to say. Because of its location, it provides a direct impact on a relatively small portion of the River. It does indirectly benefit ice jamming upstream by helping to eliminate the downstream ice that helps to hold the upstream ice in place. But, there are a lot of other factors that influence ice production and jamming that are not affected by the siphon. *(e-mail message from Harold Damron, Will County EMA)*

The following additional concerns should be kept in mind about the utility of this system:

- The siphon system was designed to thin or melt the thick frazil ice that is hard to break up. This is only one kind of ice jam on the Kankakee, so warming may not work everywhere.
- It is in a unique location, being next to a nuclear power plant's cooling ponds.
- It is dependent on continued use of the power plant, something that is not guaranteed.

CRS credit: The siphon would not receive Community Rating System credit as a flood control project. Further, direct benefits to Kankakee County would need to be shown for the County to receive credit.

8.7. Drainage System Maintenance

A community's drainage system includes its stream channels, ditches, swales, culverts, and detention ponds,. Drainage system maintenance is an ongoing program to clean out blockages caused by an accumulation of sediment or overgrowth of weedy, non-native vegetation or debris, and remediation of streambank erosion sites.

"Debris" refers to a wide range of blockage materials that may include tree limbs and branches that accumulate naturally, or large items of trash or lawn waste accidentally or intentionally dumped into channels, drainage swales or detention basins. Maintenance of detention ponds may also require revegetation or repairs to the restrictor pipe, berm or overflow structure.

The ditch on the left, located in Kankakee County, has become clogged with growth and debris. The ditch on the right was maintained and can carry storm flows without flooding the road.

A drainage system maintenance program can be very effective at reducing the threat of local flooding from smaller storms, even if all it does is remove trash and debris. Sometimes it is a very fine line that separates debris that should be removed from natural material that helps form habitat. Therefore, written procedures that are consistent with state laws and environmental concerns are usually needed.

Cities and counties usually accept responsibility for maintaining facilities on public property and drainage districts have a duty over their own channels. However, in Illinois, the responsibility for drainageway maintenance on private property, where no easements have been granted, is with the individual private property owner. This often results in very little maintenance being accomplished.

Dumping regulations: One approach that can reduce drainage problems and the workload of the maintenance crews is an anti-dumping program. Many communities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Drainageway dumping regulations need to also apply to "nonobjectionable" materials, such as grass clippings or tree branches which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Stream dumping notice

Many people do not realize the consequences of their actions. They may fill in the ditch in their front yard not realizing that it is needed to drain street runoff. They may not understand how regrading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, an anti-dumping program should include public information materials that explain the reasons for the rules as well as the penalties.

Local implementation: The Northern Illinois Anglers Association, which is headquartered in Kankakee, has sponsored an annual river clean up for 31 years. With help from the State's C2000 program, it also sponsors Illinois' first Adopt-a-River program. Participants keep their own reaches clean and help during the annual cleanup each September. All but ten miles of the Kankakee River is covered. Some tributaries are also cleaned. According to the Northern Illinois Anglers Associations chairman, over 45 tons of debris was removed from the Kankakee River during the 2013 event.

The program has received some state and county funding in some years. However, it is primarily a privately-run activity, more oriented toward clean up and habitat improvement than flood control. For example, the program would prefer to leave logs in the streams as habitat than remove them as potential dams. Further, it does include most small streams and urban ditches, waterways that could flood buildings if not kept cleared out.

The County's Highway Department inspects every county road bridge at least once every two years. If a problem is found or a complaint is received, the department will work to clear things that may affect the right-of-way. The program does not include inspecting other parts of the County's drainage system.

Most of the municipalities clear debris as it is found or in response to calls. Neither the county nor the municipalities have written procedures. However, some are developing procedures as part of the Environmental Protection Agency's NPDES program, which

requires communities in urbanized areas to begin programs of inspecting for illegal discharges into the drainage system. NPDES is discussed further in Section 5.6. IDNR has a model stream preservation program that has proved helpful, too.

Bourbonnais reported having a regular program that inspects everything at least once each year. The Village uses the results to identify priorities for maintenance and converting open ditches to enclosed storm sewers. It plans to have all ditches covered by 2010, doing a few projects each year. All new developments must enclose any ditches on their sites.

Kankakee County bi-annually inspects outfall locations in the unincorporated urbanized area as part of the requirements for its NPDES Permit. The County has implemented a policy and procedure for resolving issues with illicit discharges. This policy is available on the Planning Department's website at http://planning.k3county.net/pdf/policy.pdf.

Manteno has a regulation that requires homeowner associations to maintain the facilities in their areas. If they are not maintained, the Village has the right to do the work and charge the association.

Hopkins Park and Sun River Terrace reported that their ditches had problems with debris, growth, and sedimentation. An example of one of these problem sites is on page 8-13. They have asked for assistance in cleaning out the problem ditches in their jurisdiction, something that should precede a routine maintenance program. Hopkins Park's staff have visited Springfield seeking help from state agencies to do this.

Dumping: A review of the local ordinances found regulations similar to a stream dumping ordinance, but they did not cover all sources of debris. Most focused on unhealthy items or littering in public places. For example, Momence's ordinance states:

> No person shall throw, discharge or deposit or cause to be thrown, or deposited or discharged by any other person, any garbage, offal or refuse, or ashes, in the waters of any river, stream or creek of any tributary of the Kankakee River or on or along the banks of any of them. (6-3-15)

Such language would not make it unlawful to deposit grass clippings, branches, or stones in a ditch or along a creek.

CRS credit: Community Rating System credit is provided for a formal drainage system inspection and maintenance program with published procedures that clearly identify what can be removed and what "debris" should be allowed to stay in natural channels. The programs must keep records of each inspection and follow up maintenance. Up to 570 points are possible, but communities that do not have formal written procedures and/or only respond on an as needed basis will not receive the credit.

The CRS also provides up to 30 points for enforcing and publicizing a regulation that prohibits dumping in the drainage system.

8.8. Conclusions

1. Structural projects can protect properties from flooding, but they can have adverse impacts on downstream properties and on the environment. They can also be very expensive. Therefore, a thorough study is needed before a larger project is constructed.

2. Most flood control studies in Kankakee County have concluded that a project would be either inappropriate or infeasible.

3. Two successful projects have been the reservoir on the North Branch of Soldier Creek and the Kankakee River ice jam siphon. Except for retrofitting or replacing undersized bridges and culverts, there do not appear to be more sites where flood control projects would be applicable.

4. Sedimentation of the Kankakee River will continue to be a problem, although there are Corps of Engineers restoration projects tackling two of the greatest problem areas, Six-Mile Pool (between Aroma Park and the Kankakee dam) and at the State line. The River Rountable will begin a pilot project to remove sedimentation in the Six-Mile Pool area as soon as funding is available.

5. Most approaches to modifying stream channels and ditches have adverse impacts. However, removing obstructions, undersized culverts and cleaning out the channels could help reduce flooding that follows smaller storms. Hopkins Park and Sun River Terrace could use help in cleaning out their ditches.

6. Flooding and local drainage problems would be reduced by periodic drainage system inspections and maintenance and stream dumping regulations. There is an excellent, privately run program for the largest rivers, but most small streams and ditches are not covered by a formal maintenance program.

8.9. Recommendations

1. While there are no potential large-scale flood control projects, the County and the municipalities should pursue local projects, such as enlarging bridge openings, where there is a large enough concentration of damage-prone properties to make the projects worthwhile. The following guidelines should be followed:

    a. Each project's study should look beyond the immediate project site to ensure that no other properties will be adversely impacted.
    b. Each project's study should consider protecting and improving the natural functions of the stream and floodplain, in addition to flood protection.
    c. The design and construction should be certified by a licensed professional engineer.
    d. All relevant federal, state and local permits must be obtained.
    e. Communities and property owners that may be affected by the project should be notified.

2. When bridges and culverts and repaired and replaced, County, township and municipal road and street departments should determine if the openings should be enlarged to reduce backwater flooding on upstream properties. They should also determine if the road bed should be raised to offer safe crossing during a flood.

3. The Corps restoration projects should proceed as removing or reducing sediment in the rivers will help reduce flood levels.

4. Each municipality and the County should implement a formal and regular drainage system maintenance program modeled on CRS and IDNR program guidance and coordinated with NPDES activities.

5. The County should assist Hopkins Park and Sun River Terrace identify sources of funding to clean out problem drainage ditches, provided they institute a formal and regular drainage system maintenance program to prevent the problems from recurring.

8.10. References

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