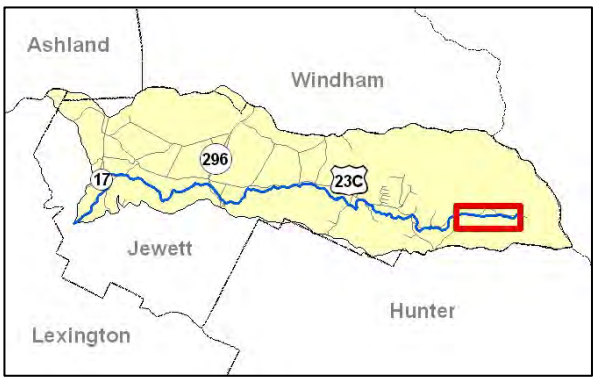
East Kill Management Unit 1

Town of Jewett – Station 84120 to Colgate Lake Dam (Station 73769)

This management unit begins just downstream of a large DEC and NWI wetland complex, continuing approximately 10,351 ft to Colgate Lake Dam in the Town of Jewett.



Management Unit 1 location
see Figure 4.0.1 for more detailed map

Stream Feature Statistics *

0% of streambanks experiencing erosion
0.3% of streambanks have been stabilized
0% of streambanks have been bermed
0 feet of clay exposures
13.7 acres of inadequate vegetation
9,842 feet of road within 300ft. of stream

* 2,431' of stream between Lake Capra and Colgate Lake not assessed

Summary of Recommendations Management Unit 1	
Intervention Level	Preservation, Passive
Stream Morphology	No recommendations at this time
Riparian Vegetation	Monitor for introduction of Japanese Knotweed and eradicate new introductions
Infrastructure	Assess Dirt Road that leads to Camp Harriman for erosion and flood hazards
Aquatic Habitat	Watershed Aquatic Habitat Study
Flood Related Threats	Mapping of floodway and floodplain
Water Quality	No recommendations at this time
Further Assessment	Assess the stretch of stream between Lake Capra and Colgate Lake

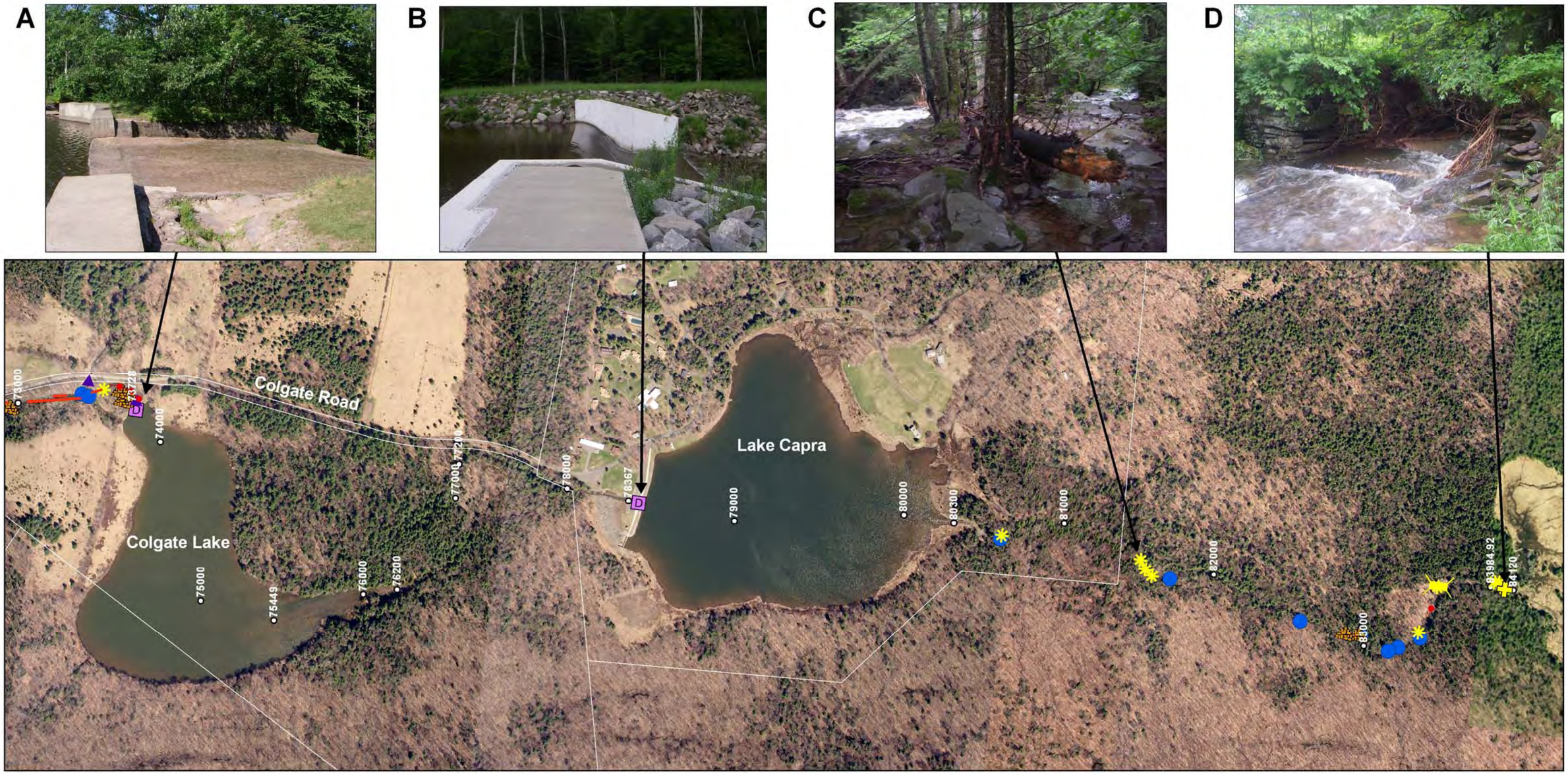
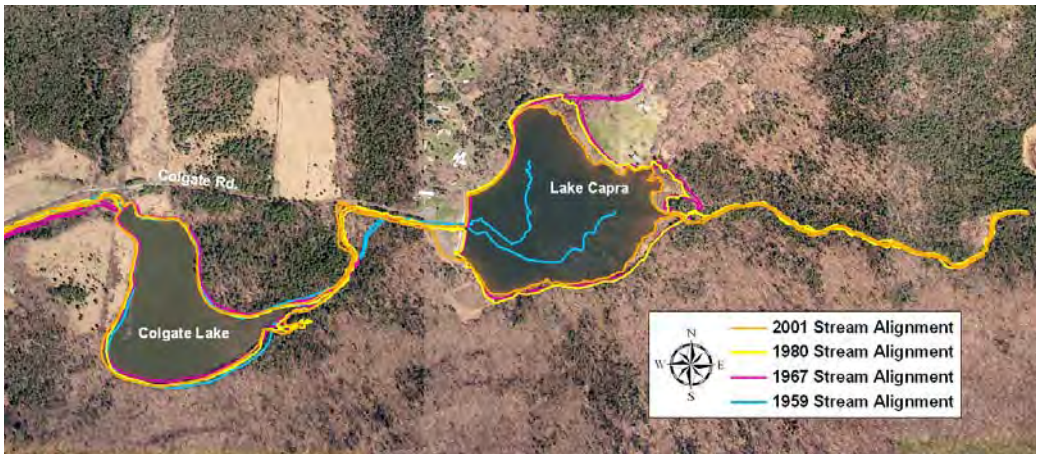


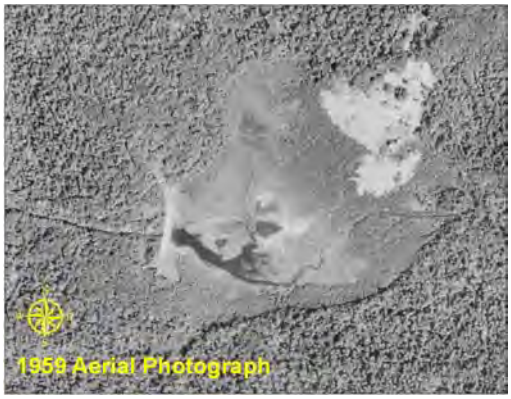
Figure 4.1.1 Management Unit 1 - 2006 aerial photography with stream feature inventory

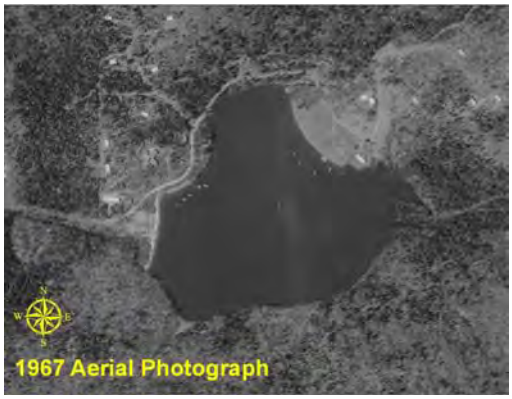
Historic Conditions



Historic stream channel alignments overlayed with 2006 aerial photograph

As seen from the historical stream alignments (above), the *planform* of the channel has experienced significant changes between 1959 and 1967. This is primarily due to the creation of Lake Capra. According to the National Inventory of Dams (NID), maintained by the U.S. Army Corps of Engineers (ACE), the Camp Harriman Dam was built in 1913 for recreational purposes. However, the formation of Lake Capra appears to have taken place between 1959 and 1967, as seen from the historical aerials below. Except for the historical changes due to the formation of Lake Capra and the subsequent changes in the size of the lake, the East Kill channel in management unit 1 has remained fairly stable. Due to its rural





Historic photographs of the Lake Capra area

nature and headwater location in the watershed, the unit had a lot of beaver activity. While beaver impoundments can sometimes be a nuisance, beavers have historically played a

beneficial and ecologically important role in the stream system. Beaver activity adds organic debris (trees, leaves, etc. which provide the base of the food chain), reduces water velocities and flood-related hazards downstream, and creates wetland areas that filter sediment and release water to the stream and groundwater slowly throughout the year.

As of 2006, according to available NYS DEC records dating back to 1996, there have been no stream disturbance permits issued in this management unit. In 2007, the NYS DEC submitted a permit application for the replacement of the Colgate Lake Dam. The proposed work would include a temporary stream crossing, removal of the existing dam, upland disposal of old dam material and construction of a new dam that will meet New York State Dam Safety criteria.

Stream Channel and Floodplain Current Conditions (2006)

Revetment, Berms and Erosion

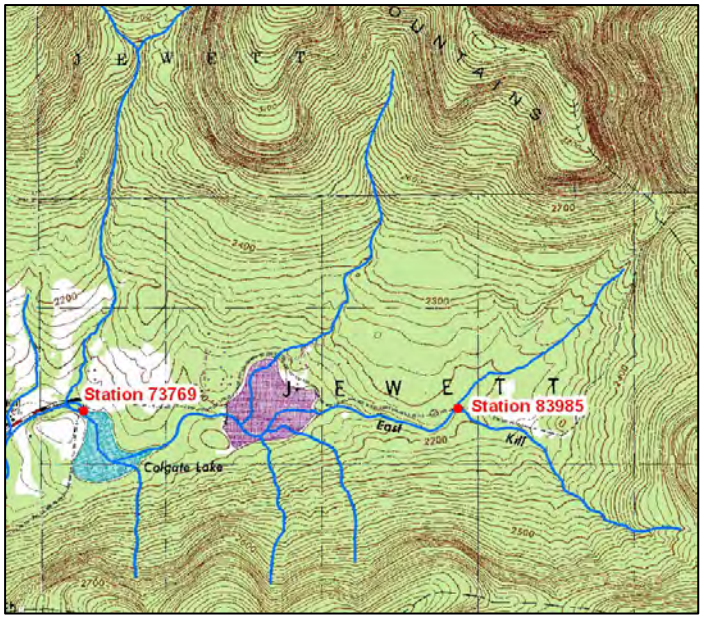
The 2006 stream feature inventory revealed that 0% (0 ft.) of the streambanks exhibited signs of active erosion along the 20,702 ft. of total channel length in the unit (Fig. 4.1.1). However, according to the Camp Harriman Director they have experienced erosion in the unassessed portion of this management unit along the dirt road into the camp. *Revetment* has been installed on 0.3% (71 ft.) of the streambanks. No berms were identified in this management unit at the time of the stream feature inventory.

Stream Channel Conditions (2006)

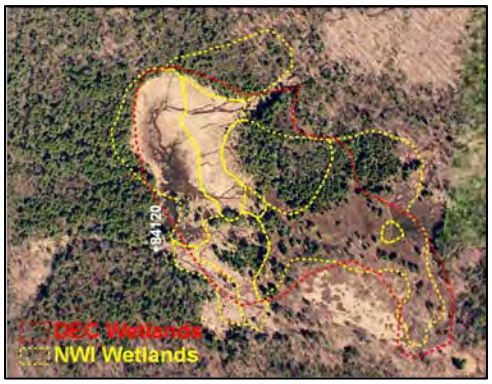
The following description of stream channel conditions references insets in foldout, Figure 4.1.1. Stream stationing presented on this map is measured in feet and begins at the confluence with the Schoharie Creek at Jewett. "Left" and "right" streambank references are oriented looking downstream, photos are also oriented looking downstream unless otherwise noted. Italicized terms are defined in the glossary. This characterization is the result of an assessment conducted in 2006. A portion of the East Kill, from the confluence of the main channel with Lake Capra to the Colgate Lake Dam, was not assessed in 2006.

Management unit #1 began at a large wetland complex. The drainage area ranged from 0.92 mi^2 at the top of the management unit to 5.17 mi^2 at the bottom of the unit. The valley slope was 0.2%.

Valley morphology in this management unit is unconfined with a broad glacial and *alluvial* valley flat. Generally, stream conditions in this management unit were stable. No eroding banks were documented in this management unit. Management efforts in this unit should focus on preservation of existing wetlands and forested areas and improvements to the riparian buffer by planting *herbaceous* areas with native trees and shrubs.



1980 USGS topographic map – Kaaterskill Quadrangle contour interval 20ft



Headwaters of East Kill flow from a large wetland complex
Approximate wetland boundaries delineated by NYSDEC and NWI

All of the land area in this management unit is owned by New York State. This management unit begins (Station 84120) as the stream flows from a wetland complex comprised of DEC and NWI wetlands. Wetlands are important features in the landscape that provide numerous beneficial functions including protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, and maintaining surface water flow during dry periods.

At the beginning of this management unit, there were two beaver dams and an old blown out crossway (Inset D, looking upstream, Station 84072). The crossway was made of stacked rock and may have been a bridged crossing. Along the right streambank the remains of this historic crossing provide lateral control of stream flow which disconnects the stream from its floodplain on the right bank; the majority of the stacked rock along the left bank appears to have washed away during previous high flows. Just downstream, there are two

woody debris obstructions. The first obstruction (Station 84039), involving a tree lying across the stream channel, contributes to backwatering upstream of the tree and scour downstream of the tree, while the second obstruction appears to have a minimal impact on stream conditions causing minor erosion along the left bank just upstream of the debris.

Woody debris at Station 84039 looking upstream

Beaver dam and foot bridge at Station 83700

As the stream channel turns sharply at the first meander bend, there is a beaver dam constructed along the left bank, followed by a small foot bridge (Station 83700). The beaver dam appeared to contribute to debris build up beneath the foot bridge.

Downstream of the meander bend, there is a stacked rock (Station 83561) wall along the right stream bank; this is the only revetment in management unit #1. The rock wall provides some scour protection for the toe of the bank, but was only in fair condition overall.

Stacked rock wall at Station 83561

Beginning at the second meander bend and continuing downstream (Station 83400 to Station 81735), there was woody debris along the right bank, followed by several *intermittent* streams, including two spring seeps, entering from the left, one intermittent stream entering from the left (Station 83240), and one intermittent stream entering from the right. These tributaries tend to

Intermittent stream at Station 83240 Looking across mainstem channel

experience periodic or seasonal flows and remain dry for part of the year; for several days prior to the management unit #1 assessment there were heavy rains, therefore, there was considerable flow entering from each of these intermittent streams.

Channel divergence and center bar at Station 82959

Downstream of the second meander bend, the stream channel diverges (Station 82959), or splits, forming a secondary channel at a well-vegetated center bar; the split channel converges, or merges, to form one stream channel approximately 116 feet downstream of the *divergence*. *Deposition*, or the accumulation of sediment, has occurred along the center bar.

Channel convergence at Station 82422

Further downstream (Station 82534), the stream channel diverges to flow around a well established center bar that is vegetated with trees, grasses and sedges; the two channels merge (Station 82422) approximately 112 feet downstream, at the end of the center bar.

Step pool sequence at Station 81980

Continuing downstream, there is a very steep gradient with a *step pool sequence* (Station 81980), a series of short drops interspaced with pools. This type of morphology is a common feature of high gradient streams, the steps provide grade control and the pools dissipate energy.

As the stream gently meanders, there is an accumulation of woody debris at three locations along 111 feet of stream length. Two of the woody debris obstructions have accumulated along the left bank and one along the right bank. Each has caused only minor

site-specific impacts. The first (Station 81636) consists of a few small fallen trees that have caused some minor scour upstream of the debris and deposition downstream of the debris, while the other debris accumulations have only (Station 81579; Inset C, Station 81525) caused minor scour upstream with no impact downstream of the debris. Just downstream of the debris accumulations, a flood chute, a secondary channel that only conveys flow during times of high water stage, enters from the right (Inset C, Station 81500). At the time of the stream feature inventory, flowing water was observed at the confluence of the flood chute with the main stem; this was due to heavy rainfall on previous days.

Flood chute at Station 80700

Further downstream on the right streambank, there is a channel divergence (Station 80700) at the start of a second flood chute. As high flows move through a flood chute, some of the sediment load deposits along the bed of the chute. The flood chute flows through the forested floodplain for approximately 306 feet until its confluence with the main channel (Station 80394), just upstream of Lake Capra.

Woody debris at Station 80622

Continuing downstream, a fallen tree (Station 80622) was lodged along the left bank, causing a partial obstruction of the channel and minor scour just downstream of the debris. A small unnamed tributary (Station 80610) flows through the forested hillside and appears stable as it enters from the left streambank (Station 80610).

East Kill confluence with Lake Capra at Station 80200

Just downstream, the mainstem channel diverges (Station 80577) forming a secondary side channel. This side channel conveys perennial stream flows for approximately 112 feet until it converges with the main channel (Station 80465) as

the stream approaches its confluence with Lake Capra (Station 80200).

Lake Capra

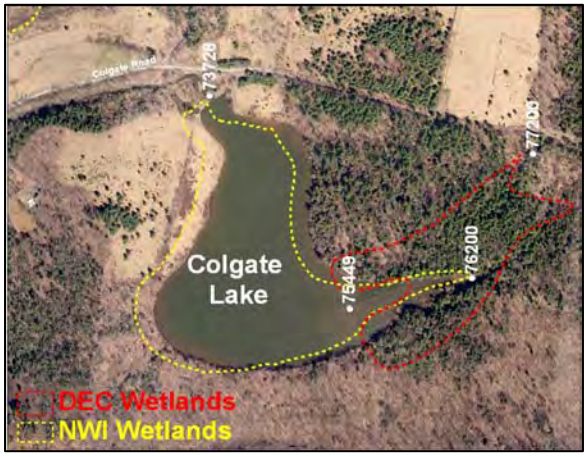
As mentioned previously, Lake Capra formed many years after the construction of Camp Harriman Dam (Inset B, Station 78431). The dam, a rockfill earth dam, was constructed of compacted excavated natural materials such as fine-grained materials, cobbles, and rock, and was built for recreational purposes. It measures 28 feet high and 640 feet in length. The drainage area of the dam is 4.6 mi^2. The maximum storage space in the reservoir is 444 acre-feet, and the maximum discharge that the dam was designed for is 6,920 cu ft/sec. According to the National Inventory of Dams, the downstream hazard potential is considered high, which is defined by the U.S. Army Corps of Engineers (USACE) as a dam where failure or misoperation will probably cause loss of human life. However, the owner of the dam, the New York State Office of Mental Retardation and Developmental Disabilities, has developed an Emergency Action Plan that will help to reduce the potential for property damage and loss of life if the dam were to fail or there was a large flood. Lake Capra is on the grounds of a camp that provides recreational opportunities for people with developmental disabilities.

Wetland boundary approximately delineated by NWI Stations 80300- 78367

Lake Capra is part of a large federally designated wetland complex (Station 80300-78367) that is comprised of three wetland types totaling approximately 52 acres in size. The predominant wetland type is P_EM1Ch, *palustrine, emergent, persistent, seasonally flooded, diked/impunded,* covers approximately 49 acres of the wetland area; the other wetland types include PUBFh, *palustrine, unconsolidated bottom,*

semipermanently flooded, diked/impounded, and PSS1Ch, *palustrine scrub-shrub, broad-leaved deciduous, seasonally flooded, diked/impounded* (see Section 2.6 for detailed wetland type descriptions).

The remainder of this management unit was not assessed during the 2006 stream feature inventory and assessment, including Colgate Lake and approximately 2,431 feet of stream length, starting at the Camp Harriman Dam and continuing to the confluence of the East Kill with Colgate Lake (Station 75900). There is a large class 2 state designated wetland, beginning at station 77200, covering approximately 15 acres surrounding the stream corridor, and ending at station 78449 (see Section 2.6 for wetland class characterization). Colgate Lake, approximately 29 acres in size, is federally designated L1UBHh, *lacustrine, limnetic, unconsolidated bottom, permanently flooded, diked/impounded.*



Wetland boundaries approximately delineated by DEC and NWI
Stations 77200-73728

Colgate Lake formed following the construction of Colgate Lake Dam (Inset A, Station 73728) in 1887. The dam, an earth gravity dam, was constructed of compacted fine-grained materials and concrete for recreational purposes. It measures 15 feet high and 275 feet in length. The drainage area of the dam is 5.5 mi^2. The maximum storage space in the reservoir is 170 acre-feet, and the maximum discharge that the dam was designed for is 1,280 cu ft/sec. According to the National Inventory of Dams, the downstream hazard potential is considered significant, which is defined by the USACE as "a dam where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns". Management unit # 1 ends at the Colgate Lake Dam.

Sediment Transport

Streams move sediment as well as water. Channel and floodplain conditions determine whether the reach aggrades, degrades, or remains in balance over time. If more

sediment enters than leaves, the reach aggrades. If more leaves than enters, the stream degrades (See Section 3.1 for more details on Stream Processes).

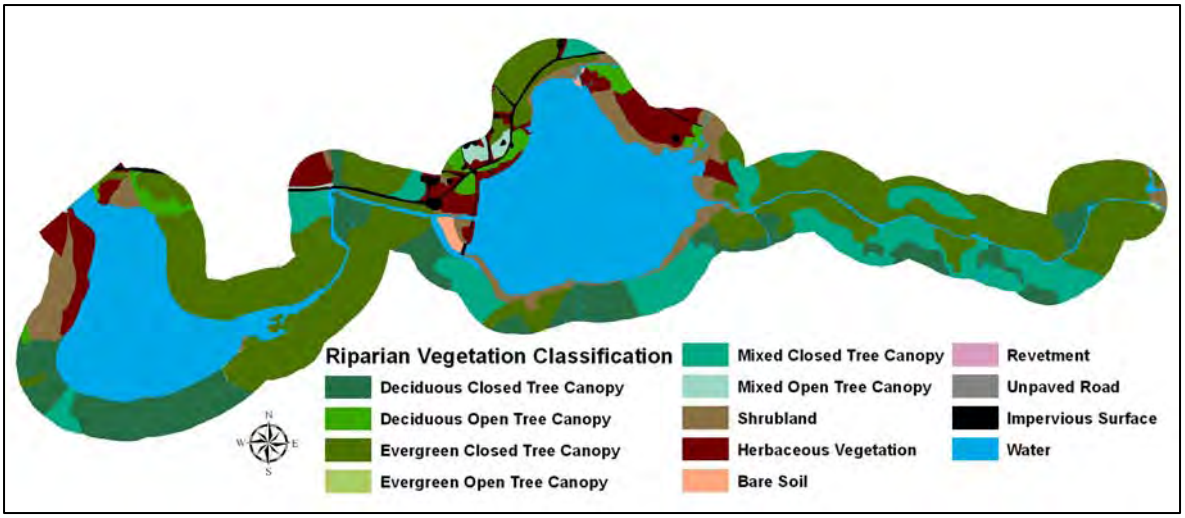
Sediment transport in this unit is influenced by valley morphology and the two dams that were constructed to create recreational lakes. The stream channel was well connected to its floodplain and there were no major sediment sources in the unit. Evidenced by lack of significant aggradation or erosion, the stream appeared to be conveying its sediment load effectively throughout the upper part of this management unit. However, sediment transport downstream of Camp Harriman Dam may be affected by sedimentation of Lake Capra. Dams tend to impact stream geomorphology and may cause channel instability when sediment is trapped and stream flow below the dam transports a smaller sediment load than would naturally occur. This may result in the erosion of stream banks to fulfill the sediment carrying capacity of the stream (Koltun et al., 1997). As mentioned previously, the stream channel downstream of the Camp Harriman Dam was not assessed in 2006, therefore the amount of erosion and aggradation along the stream from Camp Harriman Dam to the confluence with Colgate Lake is not known.

Riparian Vegetation

One of the most cost-effective and self-sustaining methods for landowners to protect streamside property is to maintain or replant a healthy buffer of trees and shrubs along the banks and floodplains, especially within the first 50 to 100 ft. of the stream. A dense mat of roots under trees and shrubs binds the soil together, making it much less susceptible to erosion. Mowed lawn (grass) does not provide adequate erosion protection on stream banks because it typically has a very shallow rooting system and cannot reduce erosive forces by slowing water velocity as well as trees and shrubs. One innovative solution is the interplanting of revetment with native trees and shrubs which can significantly increase the working life of existing rock rip-rap, while providing additional benefits to water, habitat, and aesthetic quality. *Riparian*, or streamside, forest can buffer and filter contaminants coming from upland sources, shallow groundwater or overbank flows, and slow the velocity of floodwaters causing sediment to drop out and allow for *groundwater recharge*. Riparian plantings can include a great variety of flowering trees, shrubs, and sedges native to the Catskills. Native species are adapted to our regional climate and soil conditions and typically

require less maintenance following planting and establishment. There were no riparian improvement planting sites documented within this management unit, however, it is recommended that riparian buffers be maintained or enhanced with native vegetation throughout this unit.

Some plant species that are not native can create difficulties for stream management, particularly if they are invasive. Japanese knotweed (*Fallopia japonica*), for example, has become a widespread problem in recent years. Knotweed shades out other species with its dense canopy structure (many large, overlapping leaves), but stands are sparse at ground level, with much bare space between narrow stems, and without adequate root structure to hold the soil of streambanks. The result can include rapid streambank erosion and increased surface runoff leading to a loss of valuable topsoil. Japanese knotweed locations were documented as part of the stream feature inventory conducted during the summer of 2006 (Riparian Vegetation Mapping, Appendix A). The first appearance of Japanese knotweed on the East Kill mainstem does not occur until management unit #7. The best means for controlling knotweed is prevention of its spread, therefore, efforts should be made to ensure that all fill brought into the area is clean and does not have fragments of knotweed or other invasive plants. If Japanese knotweed sprouts or small stands are observed, they should be eradicated immediately to avoid further spread within this unit and downstream management units. Periodic monitoring for knotweed introductions in this unit is recommended.

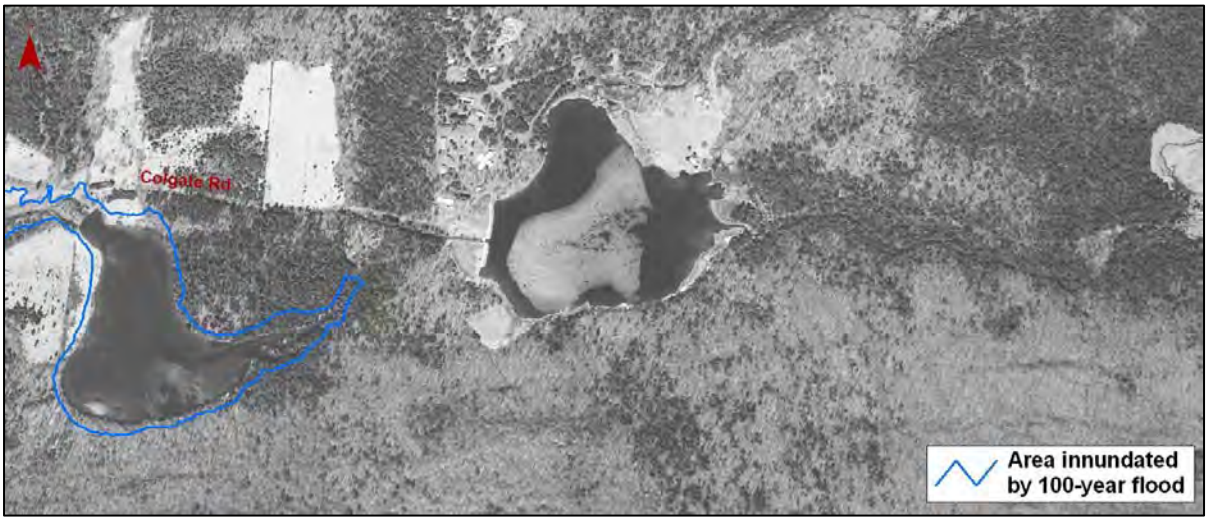


Riparian vegetation classification map based on aerial photography from 2001

An analysis of vegetation was conducted using aerial photography from 2001 and field inventories (see above map and Riparian Vegetation Mapping, Appendix A). In this management unit, the predominant vegetation type within the 300 ft. riparian buffer was forested (56 %) followed by shrubland (5.6 %). *Impervious* area (1.26 %) within this unit's buffer was primarily the local and private roadways, and the structures associated with Camp Harriman. Areas of herbaceous (non-woody) cover may present opportunities to improve the riparian buffer with tree plantings in order to promote a more mature vegetative community along the streambank and in the floodplain.

Flood Threats

As part of its National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA) performs hydrologic and hydraulic studies to produce Flood Insurance Rate Maps (FIRM), which identify areas prone to flooding. The NYS DEC Bureau of Program Resources and Flood Protection has developed new floodplain maps for the East Kill on the basis of recent surveys. The new FIRM hardcopy maps are available for viewing at the Greene County Soil & Water Conservation District Office and the Jewett Municipal Building. The FIRM maps shown in this plan are in draft form and currently under review. Finalization and adoption is expected by the end of 2007.



100-year floodplain boundary map

For this management unit, floodplain map coverage starts (Station76750) approximately 850ft. upstream of Colgate Lake. It is recommended that hydraulic analysis

be completed to create floodway and floodplain maps from the end point of existing maps upstream to the confluence of the East Kill with Lake Capra. According to the current floodplain maps (above), no existing structures in this unit appeared to be situated within the estimated 100-year floodplain. The 100-year floodplain is that area predicted to be inundated by floods of a magnitude that is expected to occur once in any 100-year period, on the basis of a statistical analysis of local flood record. Most communities regulate the type of development that can occur in areas subject to these flood risks.

Aquatic Habitat

Generally, habitat quality appeared to be good throughout this management unit. Canopy cover was adequate along much of both streambanks. Woody debris within the stream channel was observed throughout the unit. This woody debris was providing critical habitat for fish and insects, and added essential organic matter that will benefit organisms downstream. Although habitat quality appeared to be good, the two dams, Camp Harriman Dam and Colgate Dam, may pose an obstruction for fish movement up and downstream, which may impact their survivability and reproductive success. The dams may also protect the native brook trout population upstream of Lake Capra from negative impacts from brown trout stocked downstream.

It is recommended that an aquatic habitat study be conducted on the East Kill with particular attention paid to springs, tributaries and other potential thermal refuge for cold water fish, particularly trout. Once identified, efforts should be made to protect these thermal refugia locations in order to sustain a cold water fishery throughout the summer.

Water Quality

Clay/silt exposures and sediment from stream bank and channel erosion pose a potential threat to water quality in the East Kill. Fine sediment inputs into a stream increase *turbidity* and can act as a transport mechanism for other pollutants and pathogens. There were no significant clay exposures in this management unit.

Stormwater runoff can also have a considerable impact on water quality. When it rains, water falls on roadways and parking areas before flowing untreated directly into the East Kill. The cumulative impact of oil, grease, sediment, salt, litter and other unseen

pollutants found in road runoff can significantly degrade water quality. However, there were no stormwater culverts in this management unit in 2006.

Nutrient loading from failing septic systems is another potential source of water pollution. Leaking septic systems can contaminate water with nutrients and pathogens making it unhealthy for drinking, swimming, or wading. There were a few buildings located in close proximity to the stream channel in this management unit. These building owners should inspect their septic systems annually to make sure they are functioning properly. Servicing frequency varies per household and is determined by household size, tank size, and presence of a garbage disposal. Pumping the septic system out every three to five years is recommended for a three-bedroom house with a 1,000-gallon tank; smaller tanks should be pumped more often. To assist watershed landowners with septic system issues, technical and financial assistance is available through two Catskill Watershed Corporation (CWC) programs, the Septic Rehab and Replacement program and the Septic Maintenance program (See Section 2.12). Through December 2005, no homeowners within the drainage area of this management unit had made use of these programs to replace or repair a septic system.

References

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ACE, 1998-1999 (updated 2005) National Inventory of Dams Data Dictionary. Army Corps of Engineers. 1998-1999, updated 2005. http://crunch.tec.army.mil/nid/webpages/nid.cfm

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