

BONDSVILLE UPPER DAM
FOLLOWUP INSPECTION REPORT



Dam Name: Bondsville Upper Dam
State Dam ID#: 7-12-239-5
NID ID#: MA00560
Owner: Belchertown Land Trust, Inc.
Town: Palmer, MA
Consultant: Fuss & O'Neill, Inc.
Date of Inspection: May 28, 2010



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**Commonwealth of Massachusetts
Department of Conservation and Recreation
Office of Dam Safety Poor and Unsafe Condition Dam Follow-up
Inspection Form**

Dam Name: Bondsville Upper Dam
Dam Owner: Belchertown Land Trust, Inc.
Nat. ID Number: MA00560
Hazard Potential: Significant
Location of Dam (town): Palmer
Coordinate location (lat,long): 42.21914 N, 72.34088 W
Date of Inspection: May 28, 2010
Weather: Sunny, 70 degrees

Consultant Inspector(s): Christopher J. Cullen, P.E.
Fuss & O'Neill, Inc.
78 Interstate Drive
West Springfield, MA 01089

Others in Attendance at Field Inspection: David W. Hammond, EIT (Fuss & O'Neill)

Attachments:

- A. Locus map
- B. Site and Photo Location Sketch
- C. Photographs

I. Previous Inspection date/Overall Condition:

- **Date of most recent formal Phase I Inspection Report:** 3/20/2009

Inspection reports located during the file review are as follows:

- Inspection Report, August 13, 1974, by the Division of Waterways DPW
- Phase I Inspection Report, September 7, 1978, by the U.S. Army Corps of Engineers (USACE)
- Notice of Inspection, June 26, 1989, by Massachusetts Dept. of Environmental Management (DEM)
- Inspection, October 24, 1991, by DEM
- Inspection Report, June 10, 1999, by Root Engineering
- Phase I Inspection/Evaluation Report, March 20, 2009, by Tighe & Bond, Inc.
- Followup Inspection Report, December 28, 2009, by Fay Engineering Services
- Emergency Inspection, March 30, 2010, by Tighe & Bond, Inc.

- **List the overall condition reported in most recent Phase I Inspection Report: Poor**

II. Previous Inspection Deficiencies:

Deficiencies identified in the most recent Phase I Inspection Report (cited above) and in other previous reports are listed in the following table, with the current condition at the time of this follow-up inspection.

Previously Identified Deficiency	Resolution or Current Condition
Vegetation and large vertical cracks on right training wall (one above the crest and one downstream)	<u>Unresolved</u> – Large vertical cracks and vegetation were observed in the right training wall.
Missing/loose stones and excessive vegetation on left training wall	<u>Unresolved</u> – Masonry has not been repaired. Minor vegetation present on left training wall.
Water erosion on right embankment, especially the downstream slope against the training wall	<u>Unresolved</u> – Erosion was observed on the downstream side of the right embankment, behind the training wall.
Training wall left of canal spillway has vegetation and loose stones	<u>Unresolved</u> – Masonry has not been repaired. Vines and other vegetation present on left auxiliary spillway training wall.
Leakage from the downstream face of the primary and canal spillways	<u>Unresolved</u> – Leakage was observed in the downstream masonry face of both the primary and auxiliary spillways.
Unknown operational status and condition of two low-level outlets, with both apparently leaking or partially open	<u>Undetermined</u> – No attempt was made to operate the low-level outlet during the inspection.
Failing head gate structure across canal partially impedes flow into the canal	<u>Unresolved</u> – Failed wooden structure is still present. Logs and other debris are trapped along its upstream side.
Spillway inadequate to discharge SDF (only passes 61% of 100-year flood)	<u>Unresolved</u> – Spillway has not been reconstructed.
No Operations and Maintenance Manual	<u>Unresolved</u> – No evidence of an O&M Manual was found during an ODS file search for this dam.

III. Overall Condition of Dam at the Time of the Current Follow-up Inspection:

- **State the current condition: Poor**
- **Have conditions changed since the previous inspection? (y/n):**
No – Conditions at the dam do not appear to have changed substantially since the previous inspection.



IV. Comparison of Current Conditions to Condition Listed in Previous Phase I Inspection Report:

- **Have any of the deficiencies listed in the previous Phase I Inspection Report worsened?**

No – In general, the deficiencies listed in the 2007 Phase I Inspection Report are still evident. The current status of previously reported deficiencies is included as a table in Section II, above.

- **If yes, list the changes.** N/A
- **Are there any additional deficiencies that have been identified in the current inspection?** Yes
- **If yes, list the deficiencies and describe.**

Fuss & O'Neill's inspecting engineers noted the following additional deficiencies:

- Rutting was observed in a muddy area along the dam crest right of the primary spillway.
- Logs and other debris was observed at the left end of the auxiliary spillway.

V. Dam Safety Orders:

The following dam safety orders have been issued to the dam owner pertaining to this dam:

- Dam Safety Order to Conduct Dam Safety Phase I Inspection, issued August 9, 2006
- Dam Safety Order to Conduct Dam Safety Phase I Inspection, issued December 19, 2008
- Certificate of Non-Compliance and Dam Safety Order, issued February 22, 2009

VI. Maintenance:

- **Indicate if there exists an operation and maintenance plan for the dam.**

According to previous reports, no formal operation and maintenance plan exists for the dam.

- **Indicate if it appears the dam is being maintained.**

Relatively new chain link security fencing is present on the auxiliary spillway left training wall and the primary spillway right training wall. Otherwise, it does not appear that the dam is being regularly maintained.

**VII. Recommendations:**

Fuss & O'Neill recommends the following actions be taken to address the deficiencies identified during the course of the inspection. These are consistent with recommendations contained in previous inspection reports for this dam.

- Evaluate condition and operational status of outlet sluiceways and operators, and repair/restore to full functionality.
- Investigate seepage through the downstream masonry face of both spillways.
- Remove trees, brush, and woody vegetation from the dam and all appurtenant features to a distance of 20 feet. Remove stumps and roots from embankments, fill and compact the voids, and reestablish vegetative cover. Carefully remove roots from stone masonry features and repair/repoint as necessary.
- Replace missing masonry blocks in primary spillway left training wall / auxiliary spillway right training wall. Repair mortar in masonry adjacent to spillways.
- Remove trees from downstream area within the river, to prevent accumulation of debris.
- Establish a maintenance regimen to keep vegetation trimmed from within 20 feet of the dam and all appurtenant features and maintain the gravel access road. Control hillside runoff to prevent embankment erosion.
- Remove remains of wood canal head gates.
- Develop an Operations and Maintenance Manual for the dam.

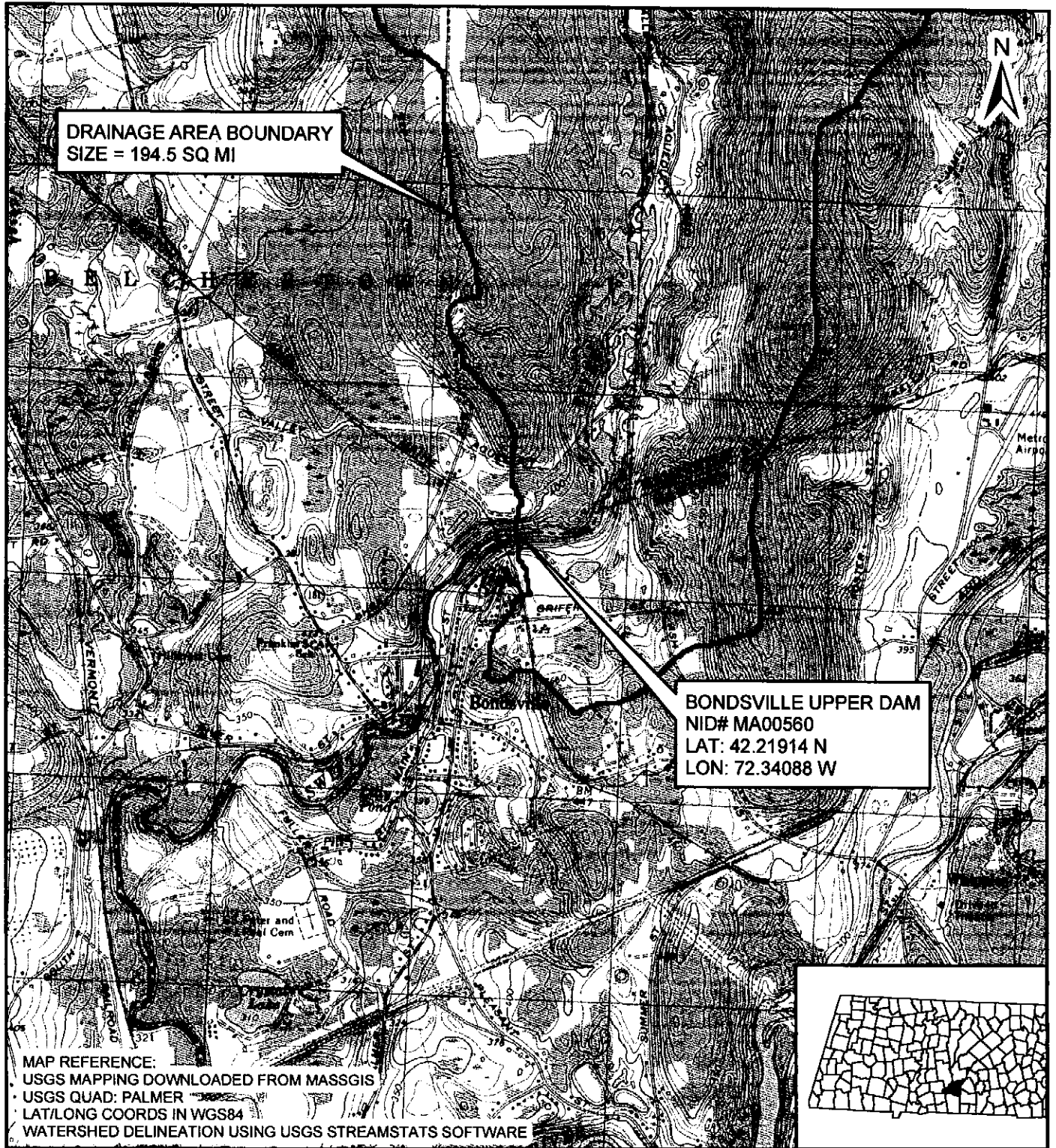
VIII. Other Comments or Observations:

Phase I reports for this dam in 1999 and 2009 used FEMA Flood Insurance Study (FIS) data to estimate that the dam's spillway capacity is only 61 percent of the spillway design flood (SDF), which is the 500-year flood. A 2010 inspection report by Fay Engineering included a preliminary hydrologic and hydraulic (H&H) study that concluded the dam likely is able to convey the 500-year SDF. A detailed H&H analysis would need to be completed to resolve this discrepancy.



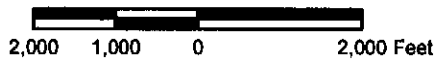
ATTACHMENT A

Locus Map



MAY 2010

FIGURE 1



MASSACHUSETTS DEPT OF CONSERVATION & RECREATION

SCALE
 HORZ: 1 INCH = 2,000 FEET
 VERT:
 DATUM
 HORZ:
 VERT: NGVD29 (10-FOOT CONTOURS)



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LOCUS MAP

BONDSVILLE UPPER DAM (MA00560)

PALMER, MASSACHUSETTS



ATTACHMENT B

Site and Photo Location Sketch



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PREPARED BY
DWH

DATE
5-28-10

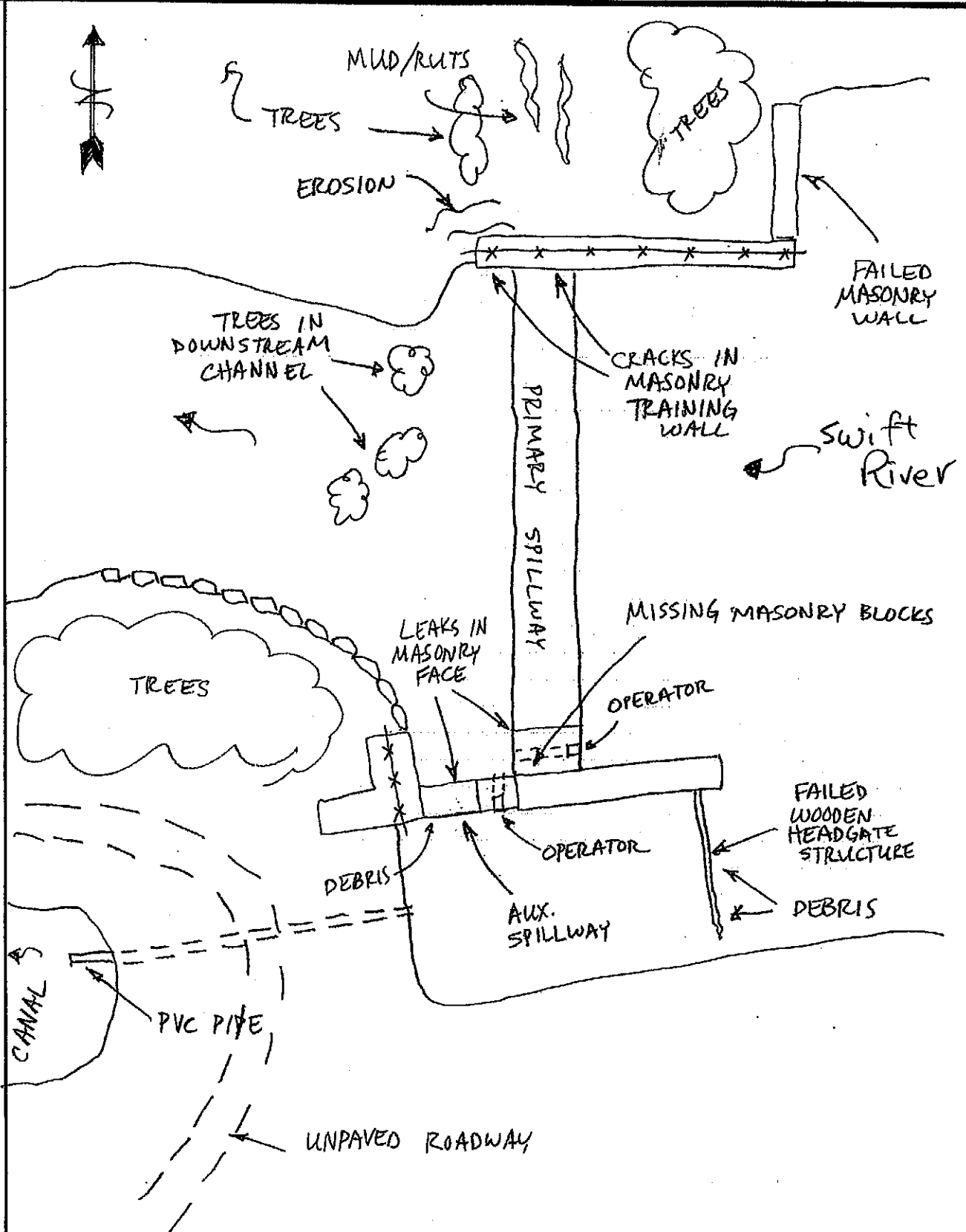
CHECKED BY
CJC

DATE
6/9/10

PROJECT NO.
20090254.D10

FIELD SKETCH FOR BONDSVILLE UPPER DAM (MA00560), PALMER

SHEET NO.
1 of 1





ATTACHMENT C

Photographs

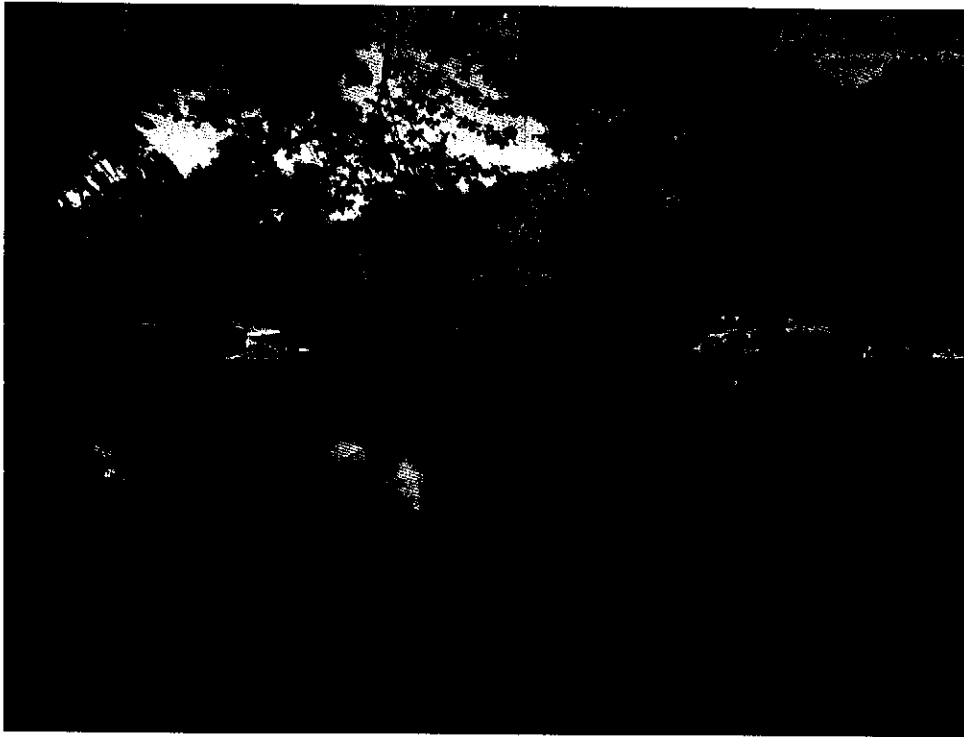


Photo 1: Overview of dam from upstream



Photo 2: Overview of dam from downstream



Photo 3: Overview of upstream face from right abutment



Photo 4: Overview of upstream face from left abutment. Note failed head gate structure and accumulated debris at historical canal intake.



Photo 5: Overview of dam crest from right abutment. Note trees and rutted muddy area along crest.

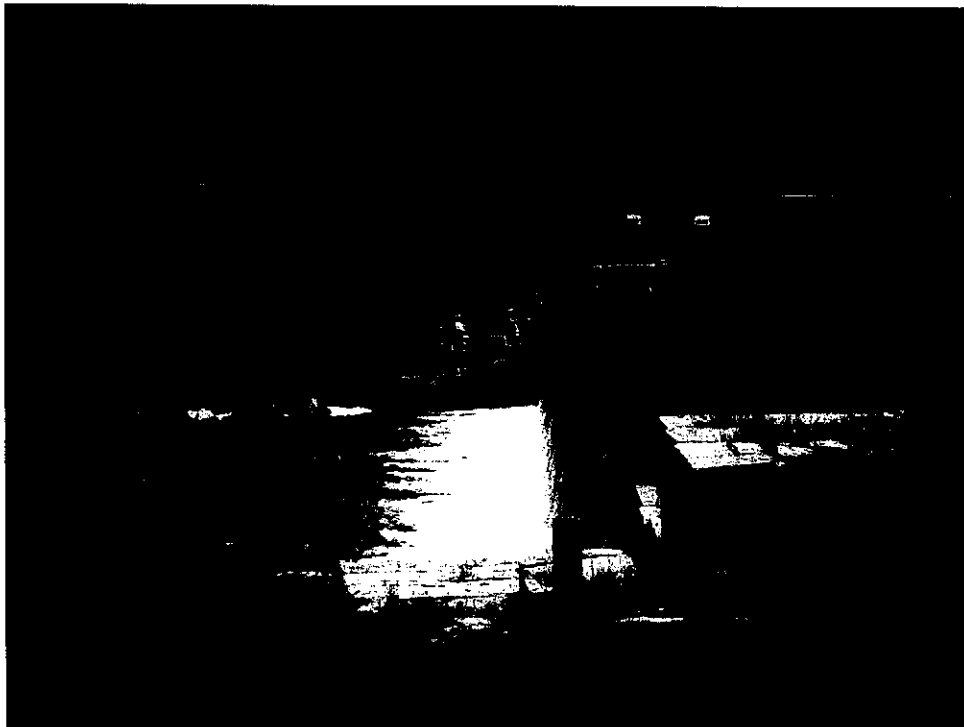


Photo 6: Overview of dam crest from left abutment

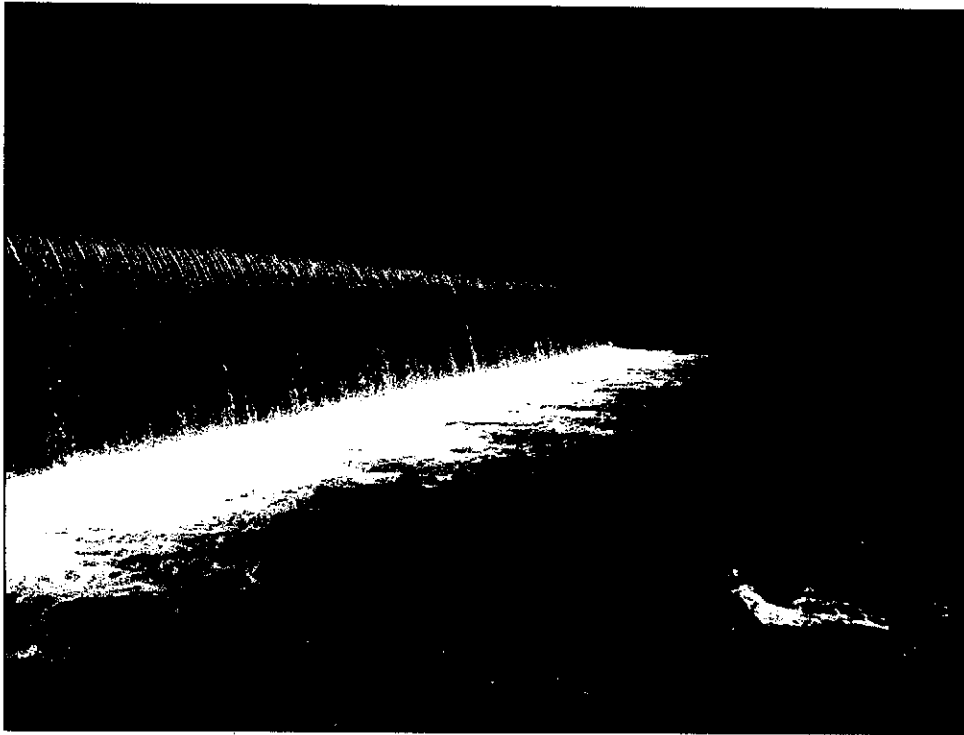


Photo 7: Overview of downstream face from right abutment

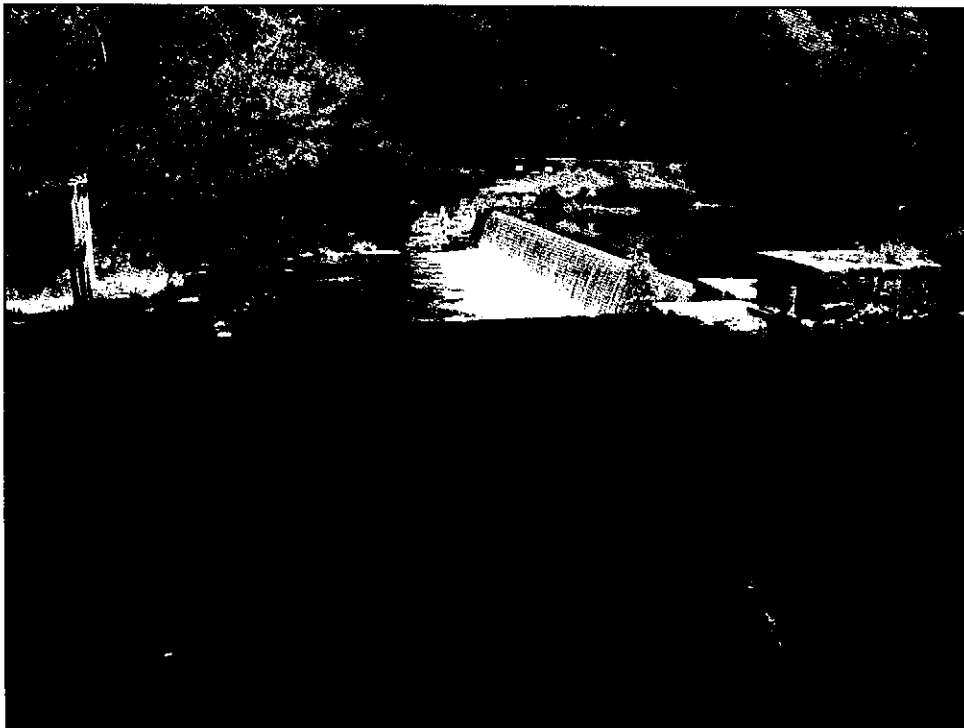


Photo 8: Overview of downstream face from left abutment



Photo 9: Overview of primary spillway from upstream



Photo 10: Overview of primary spillway from downstream



Photo 11: Overview of primary spillway right training wall.



Photo 12: Primary spillway left training wall, first of two photos (downstream end). Note missing masonry blocks.

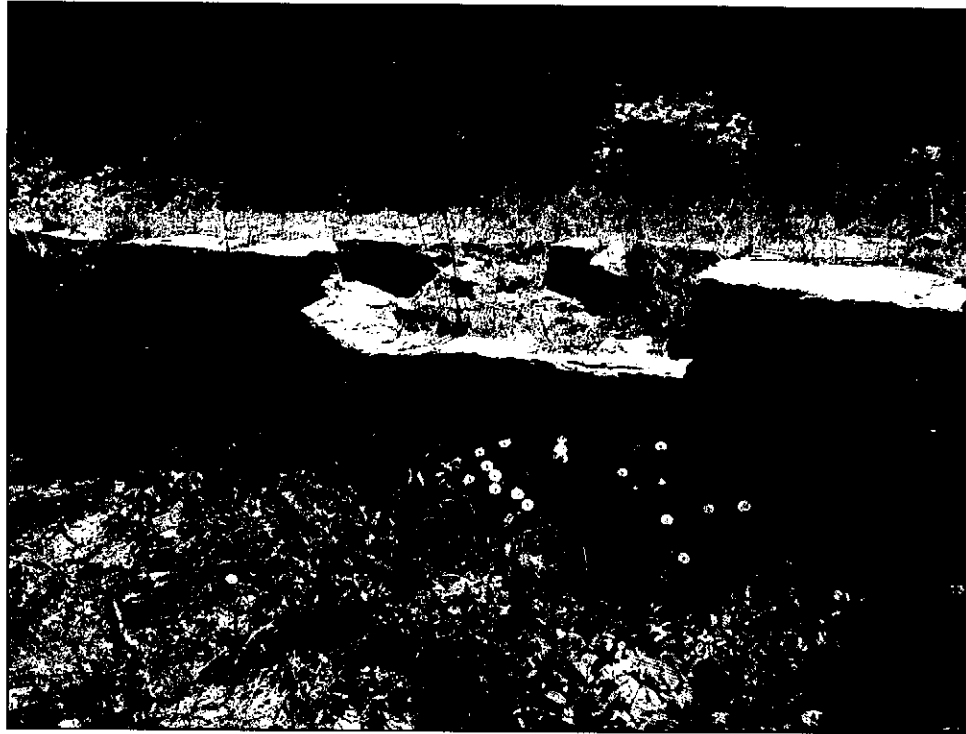


Photo 13: Primary spillway left training wall, second of two photos. Note missing capstone.

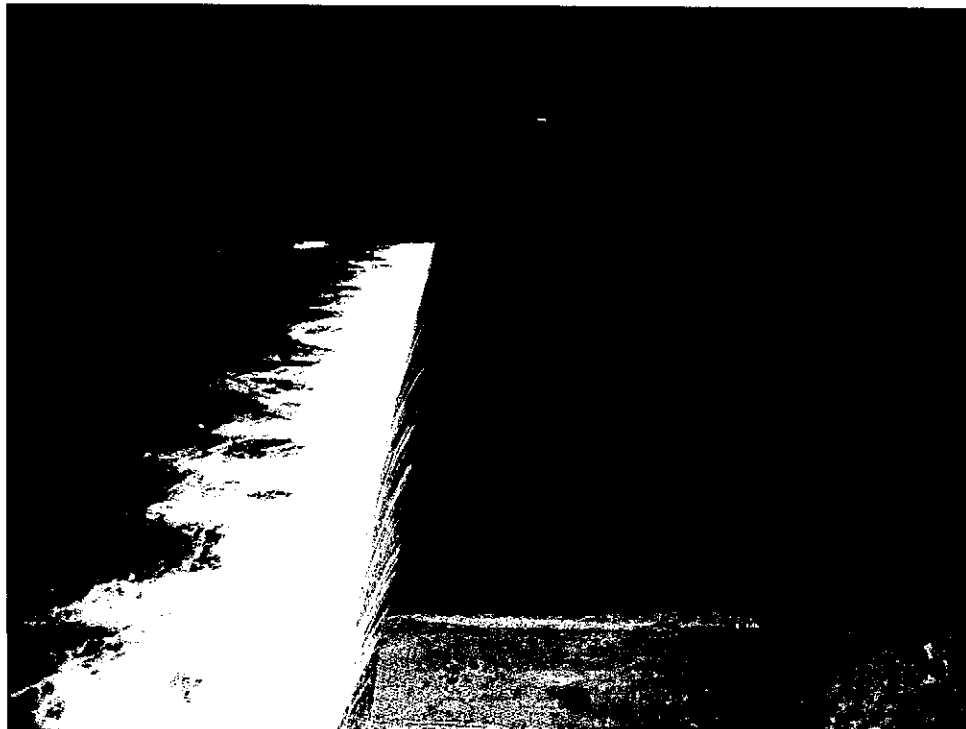


Photo 14: Overview of primary spillway weir

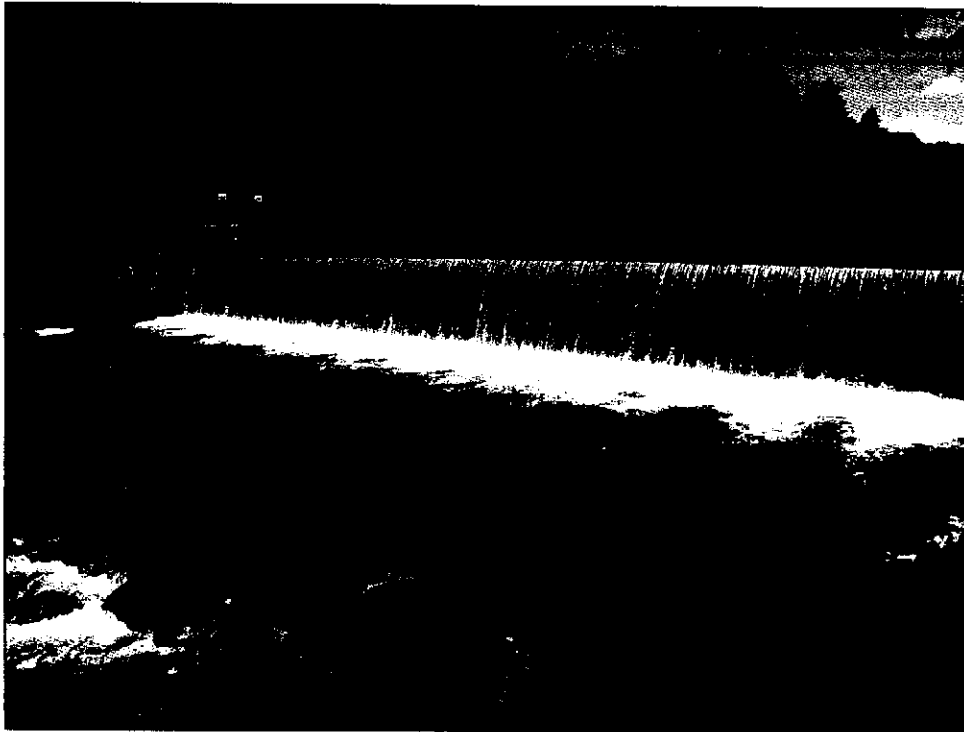


Photo 15: Overview of primary spillway stilling basin



Photo 16: Overview of auxiliary spillway from upstream/canal side



Photo 17: Overview of auxiliary spillway from downstream



Photo 18: Auxiliary spillway right training wall



Photo 19: Overview of auxiliary spillway left training wall



Photo 20: Overview of auxiliary spillway weir

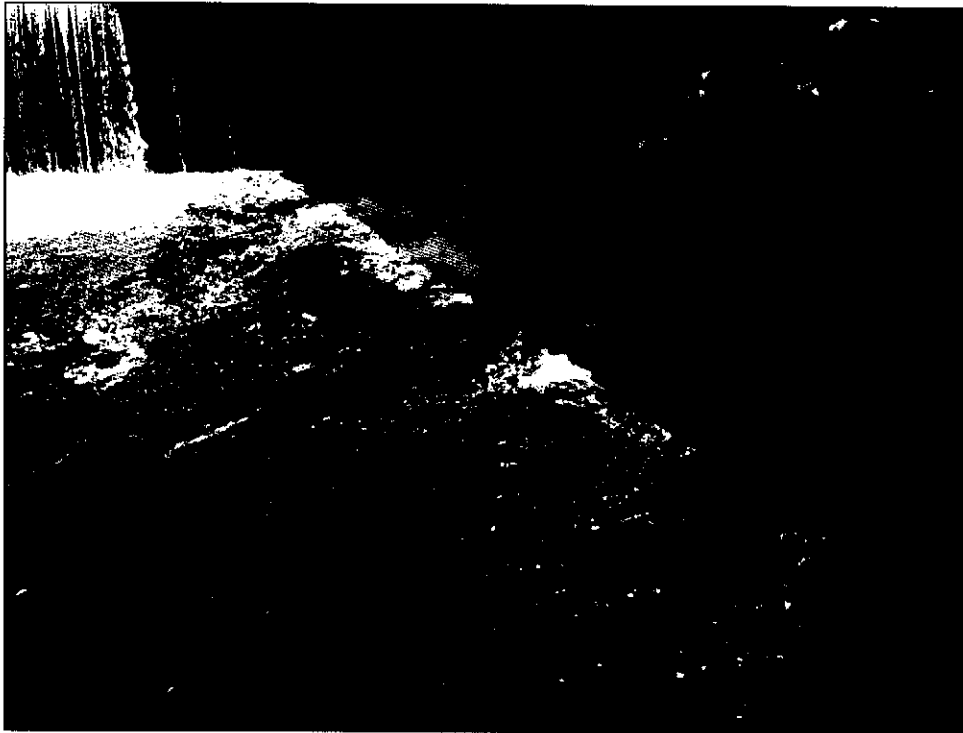


Photo 21: Overview of auxiliary spillway stilling basin



Photo 22: Overview of downstream channel

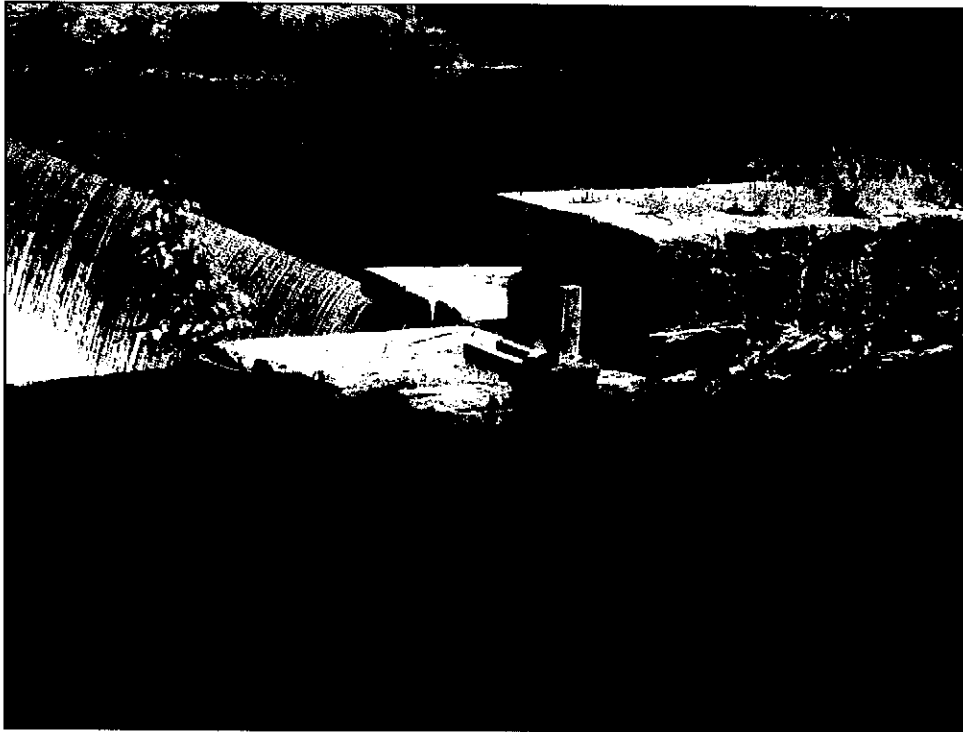


Photo 23: Auxiliary low-level outlet operator (right of auxiliary spillway)



Photo 24: Primary low-level outlet operator (left of primary spillway)

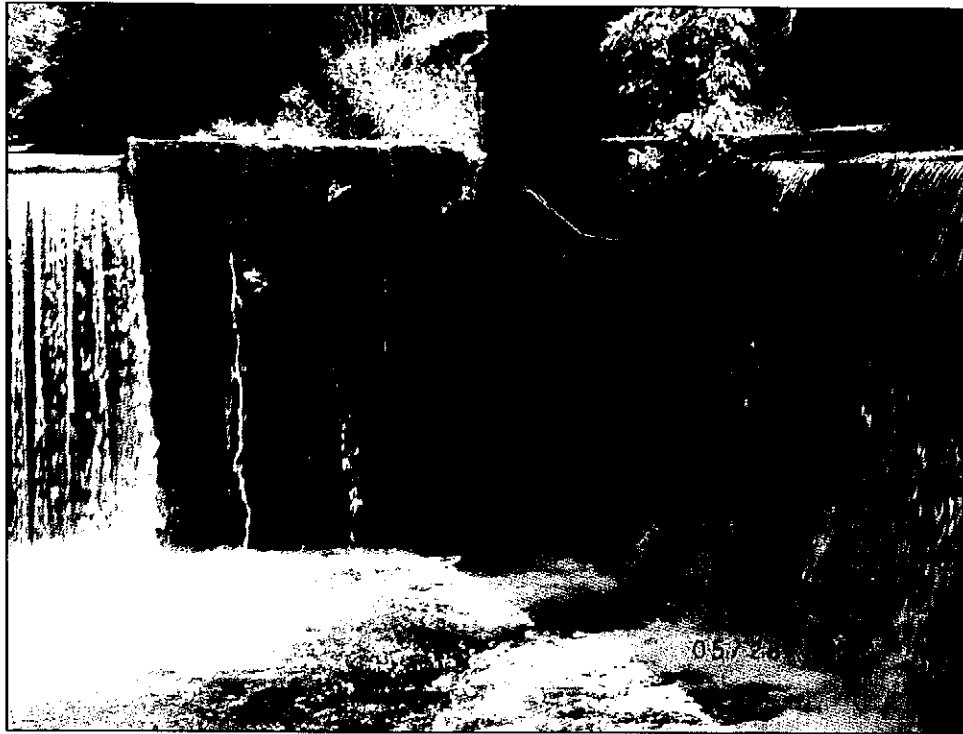


Photo 25: Primary (photo left) and auxiliary (photo right) low-level outlet discharge points. Note discharge from leaking/partially open auxiliary outlet.

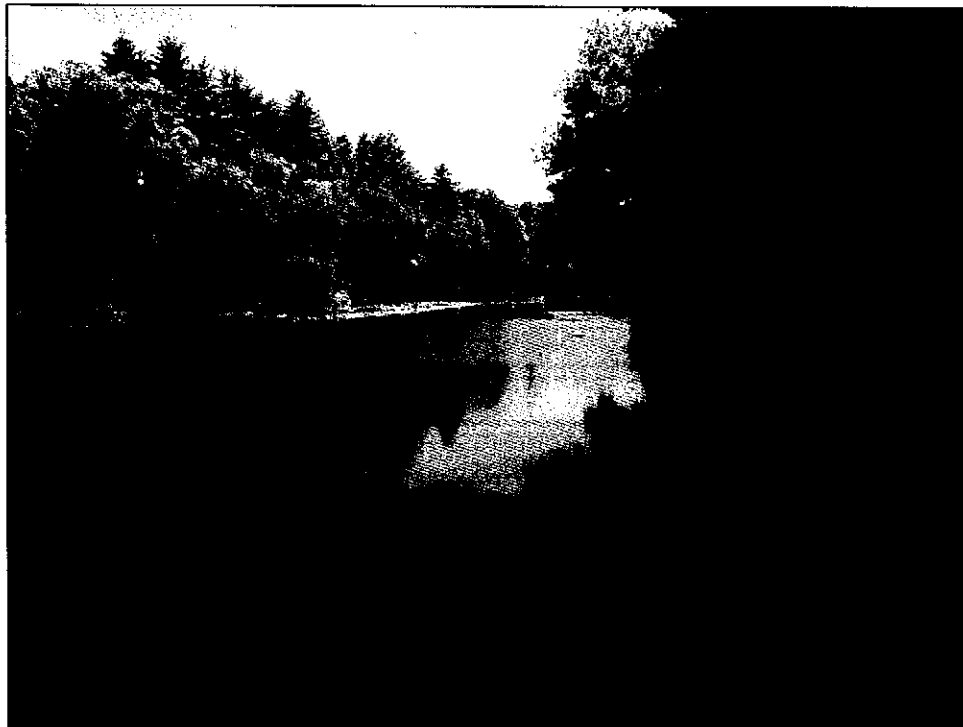


Photo 26: Overview of impoundment (Still River) from dam



Photo 27: Embankment fill blocking historical canal and diverting all canal flow through the auxiliary spillway.



Photo 28: Overview of historical canal facing downstream, viewed from embankment fill. Note PVC pipe for conservation flow.



Photo 29: Large vertical cracks in masonry of primary spillway right training wall



Photo 30: Missing mortar from masonry right of auxiliary spillway

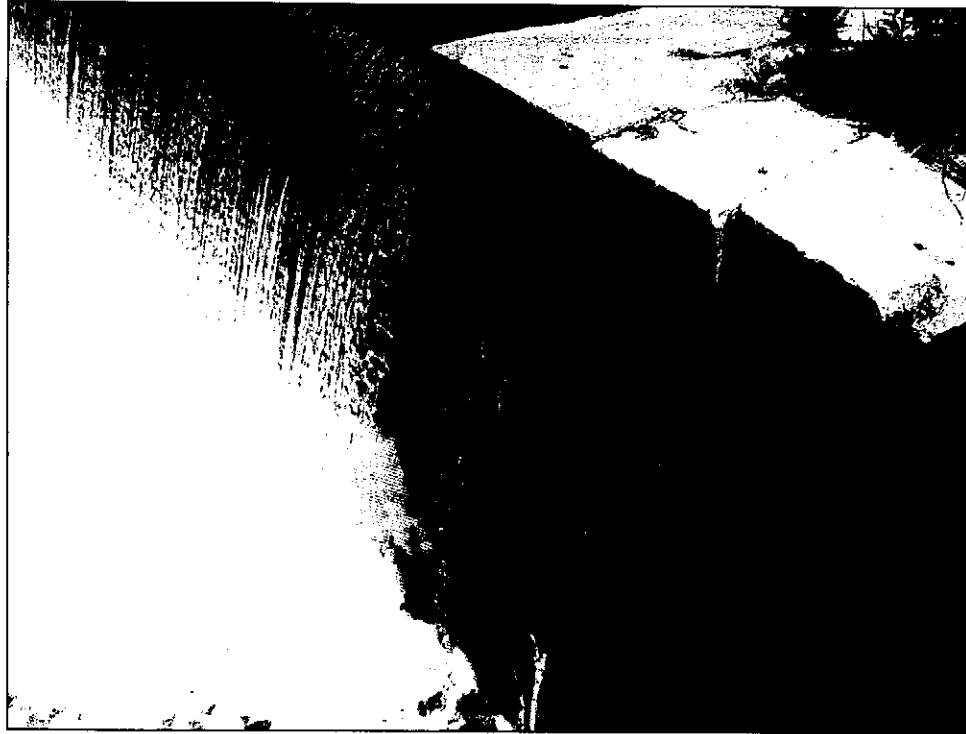


Photo 31: Water leaking through the primary spillway downstream masonry face



Photo 32: Water leaking through the auxiliary spillway downstream masonry face



Photo 33: Erosion behind the downstream side of the primary spillway right training wall



Photo 34: Trees growing in downstream channel