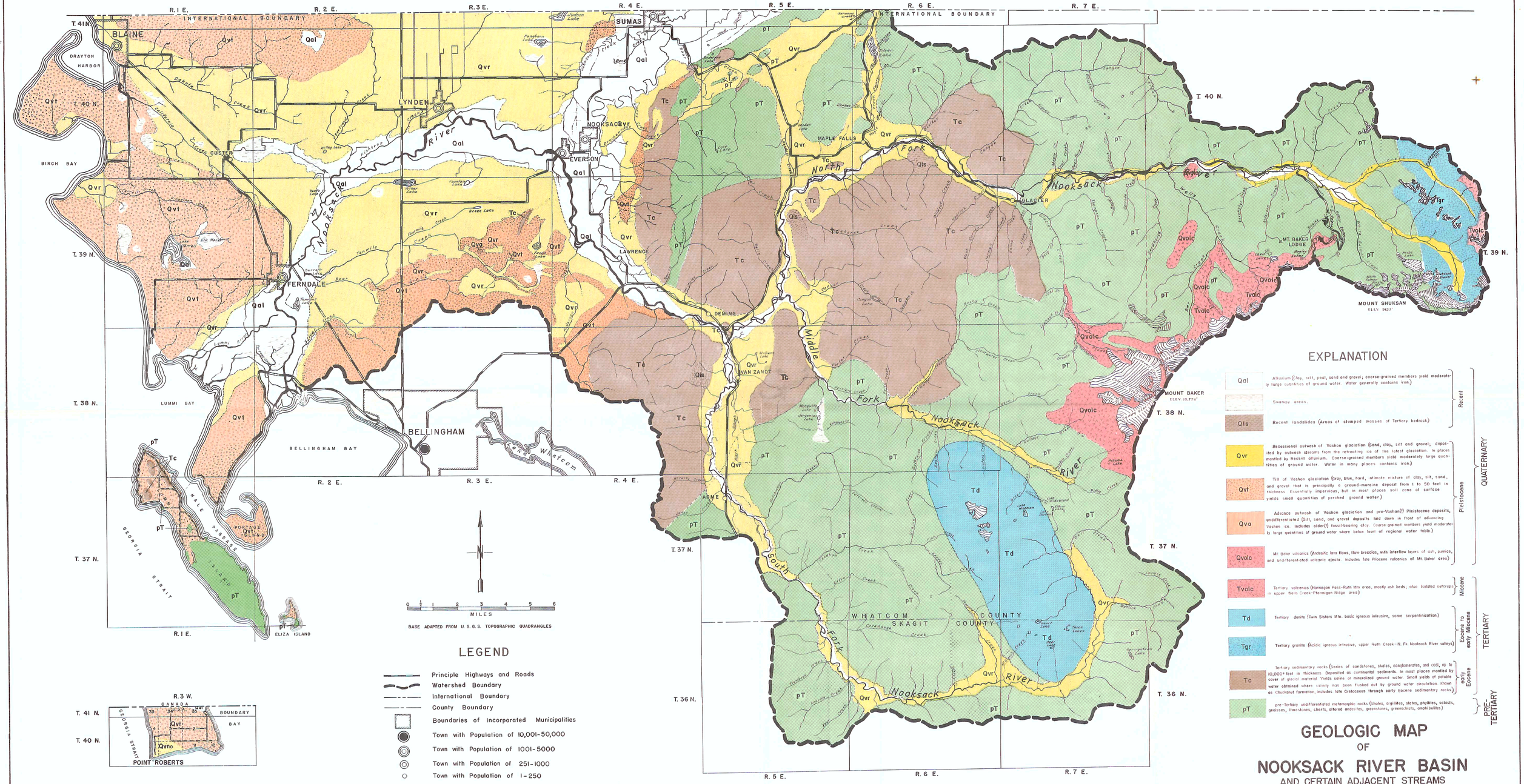


EXPLANATION

QUATERNARY

Recent

- **Qal** — Alluvium (Clay, silt, peat, sand and gravel; coarse-grained members yield moderately large quantities of ground water. Water generally contains iron.)
- Swampy areas.
- **Qls** — Recent landslides (Areas of slumped masses of Tertiary bedrock)

Pleistocene

- **Qvr** — Recessional outwash of Vashon glaciation (Sand, clay, silt and gravel; deposited by outwash streams from the retreating ice of the latest glaciation. In places mantled by Recent alluvium. Coarse-grained members yield moderately large quantities of ground water. Water in many places contains iron.)
- **Qvt** — Till of Vashon glaciation (Gray, blue, hard, intimate mixture of clay, silt, sand, and gravel that is principally a ground-moraine deposit from 1 to 50 feet in thickness. Essentially impervious, but in most places soil zone at surface yields small quantities of perched ground water.)
- **Qva** — Advance outwash of Vashon glaciation and pre-Vashon(?) Pleistocene deposits, undifferentiated (Silt, sand, and gravel deposits laid down in front of advancing Vashon ice. Includes older(?) fossil-bearing clay. Coarse-grained members yield moderately large quantities of ground water where below level of regional water table.)
- **Qvolc** — Mt Baker volcanics (Andesitic lava flows, flow breccias, with interflow layers of ash, pumice, and undifferentiated volcanic ejecta. Includes late Pliocene volcanics of Mt Baker area)

TERTIARY

Miocene

- **Tvolc** — Tertiary volcanics (Hannegan Pass-Ruth Mtn area, mostly ash beds; also isolated outcrops in upper Bells Creek-Ptarmigan Ridge area)

Eocene to early Miocene

- **Td** — Tertiary dunite (Twin Sisters Mtn. basic igneous intrusive, some serpentinization.)
- **Tgr** — Tertiary granite (Acidic igneous intrusive, upper Ruth Creek-N. Fk. Nooksack River valleys)

early Eocene

- **Tc** — Tertiary sedimentary rocks (Series of sandstones, shales, conglomerates, and coal, up to 10,000+ feet in thickness. Deposited as continental sediments. In most places mantled by cover of glacial material. Yields saline or mineralized ground water. Small yields of potable water obtained where salinity has been flushed out by ground water circulation. Known as Chuckanut formation, includes late Cretaceous through early Eocene sedimentary rocks.)

PRE-TERTIARY

- **pT** — pre-Tertiary undifferentiated metamorphic rocks (Shales, argillites, slates, phyllites, schists, gneisses, limestones, cherts, altered andesites, greenstones, greenschists, amphibolites.)

GEOLOGIC MAP OF NOOKSACK RIVER BASIN AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960

PLATE I

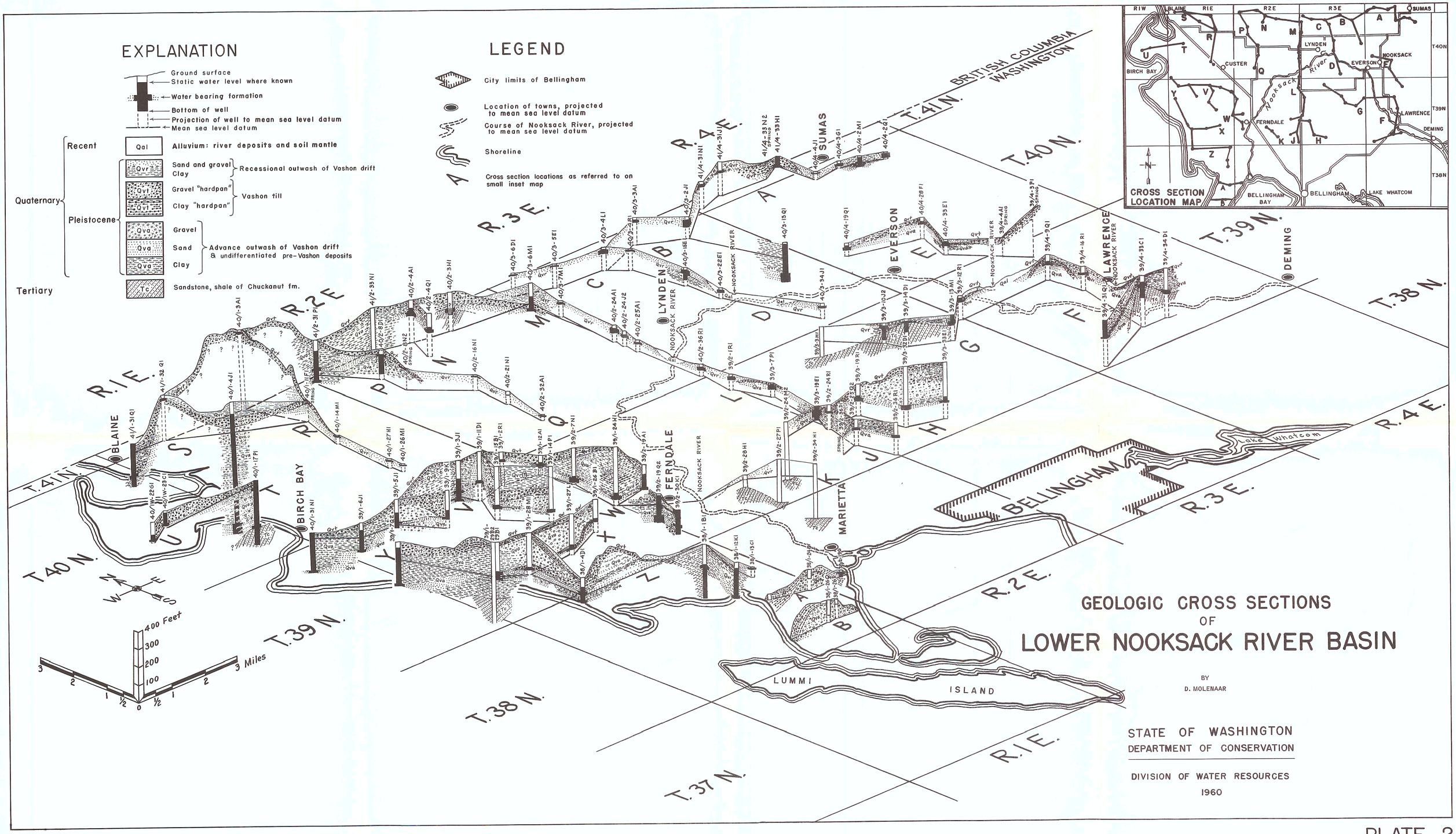
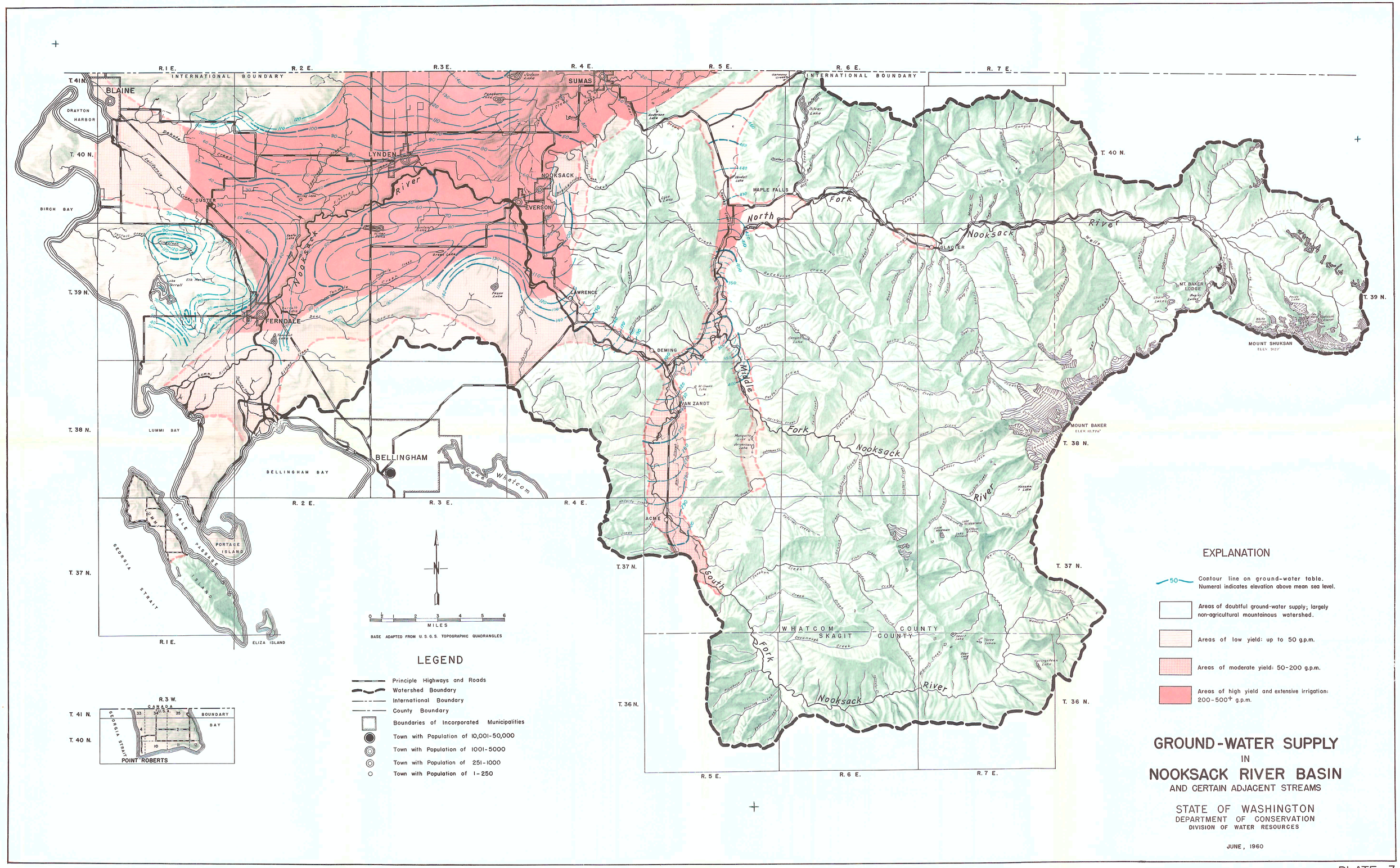

EXPLANATION
Ground surface
Static water level where known
Water bearing formation
Bottom of well
Projection of well to mean sea level datum
Mean sea level datum
Quaternary
Recent
Qal
Alluvium: river deposits and soil mantle
Pleistocene
Qvr
Sand and gravel
Clay
Recessional outwash of Vashon drift
Qvt
Gravel "hardpan"
Clay "hardpan"
Vashon till
Qva
Gravel
Sand
Clay
Advance outwash of Vashon drift & undifferentiated pre-Vashon deposits
Tertiary
Tc
Sandstone, shale of Chuckanut fm.
LEGEND
City limits of Bellingham
Location of towns, projected to mean sea level datum
Course of Nooksack River, projected to mean sea level datum
Shoreline
Cross section locations as referred to on small inset map
BRITISH COLUMBIA
WASHINGTON
T.41N.
T.40N.
T.39N.
T.38N.
T.37N.
R.1E.
R.2E.
R.3E.
R.4E.
BLAINE
BIRCH BAY
LYNDEN
FERNDALE
SUMAS
EVERSON
MARIETTA
LAWRENCE
DEMING
BELLINGHAM
NOOKSACK RIVER
Lake Whatcom
LUMMI ISLAND
CROSS SECTION LOCATION MAP
BELLINGHAM BAY
400 Feet
300
200
100
3 Miles
GEOLOGIC CROSS SECTIONS
OF
LOWER NOOKSACK RIVER BASIN
BY
D. MOLENAAR
STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
1960

PLATE 2

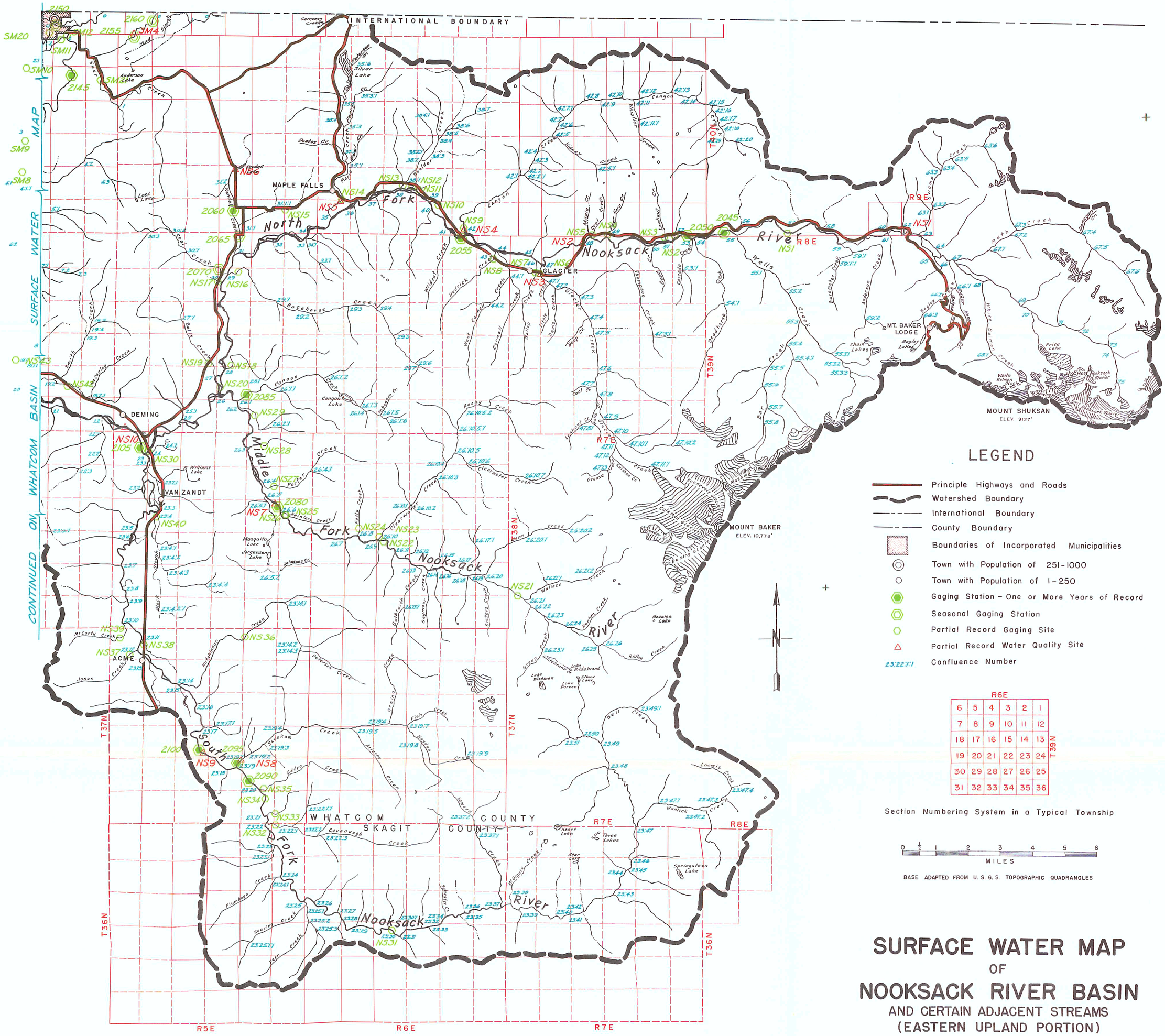


GROUND-WATER SUPPLY IN NOOKSACK RIVER BASIN

AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960



SURFACE WATER MAP
OF
NOOKSACK RIVER BASIN
AND CERTAIN ADJACENT STREAMS
(EASTERN UPLAND PORTION)

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960

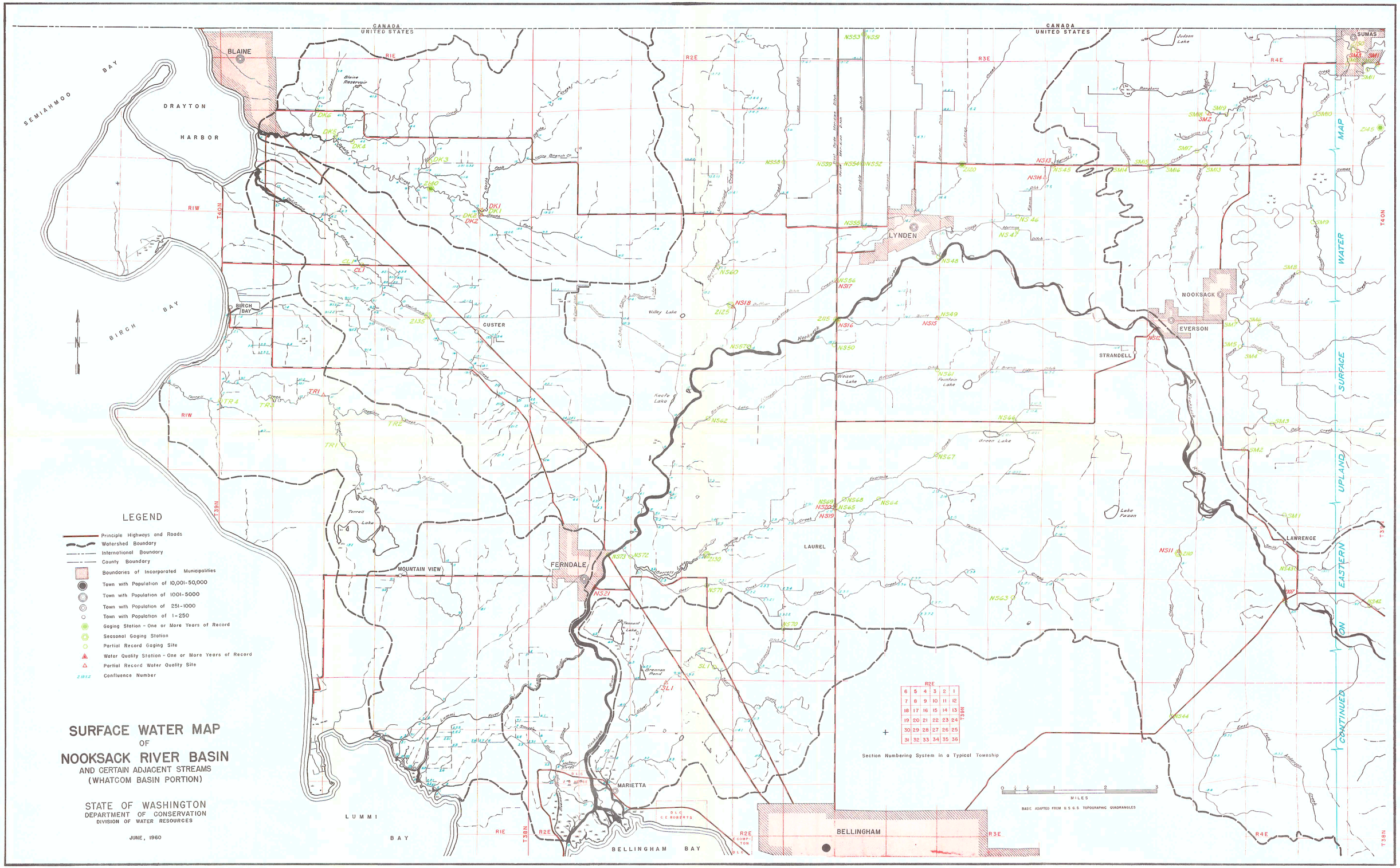
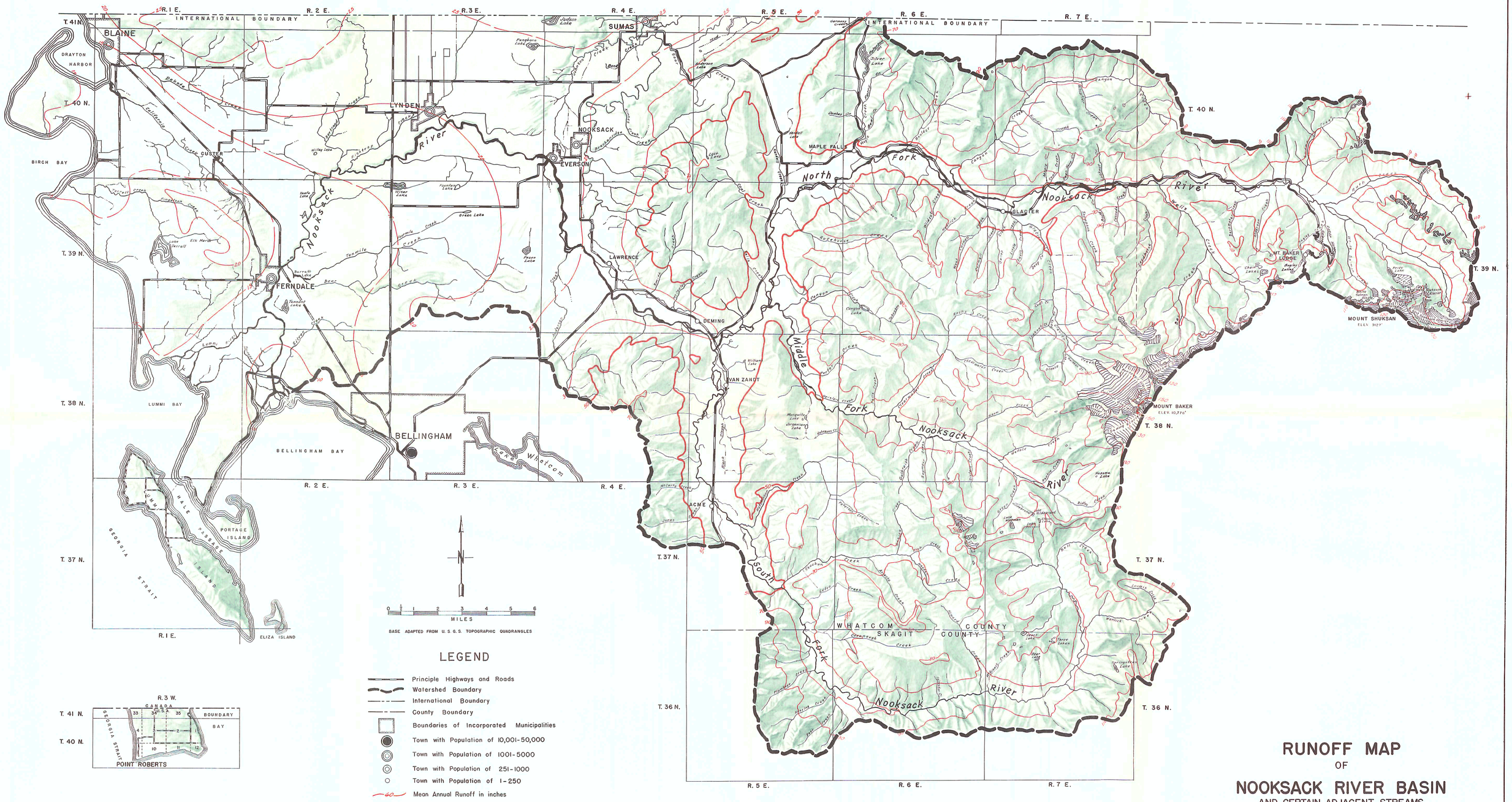

SURFACE WATER MAP
OF
NOOKSACK RIVER BASIN
AND CERTAIN ADJACENT STREAMS
(WHATCOM BASIN PORTION)
STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES
JUNE, 1960
LEGEND
Principle Highways and Roads
Watershed Boundary
International Boundary
County Boundary
Boundaries of Incorporated Municipalities
Town with Population of 10,001-50,000
Town with Population of 1001-5000
Town with Population of 251-1000
Town with Population of 1-250
Gaging Station - One or More Years of Record
Seasonal Gaging Station
Partial Record Gaging Site
Water Quality Station - One or More Years of Record
Partial Record Water Quality Site
Confluence Number
CANADA
UNITED STATES
SEMIAHMOO BAY
DRAYTON HARBOR
BIRCH BAY
LUMMI BAY
BELLINGHAM BAY
BLAINE
BIRCH BAY
CUSTER
LYNDEN
NOOKSACK
EVERSON
STRANDELL
SUMAS
LAWRENCE
LAUREL
FERNDALE
MOUNTAIN VIEW
MARIETTA
BELLINGHAM
Section Numbering System in a Typical Township
MILES
BASE ADAPTED FROM U.S.G.S. TOPOGRAPHIC QUADRANGLES
SURFACE WATER MAP
UPLAND
EASTERN
CONTINUED

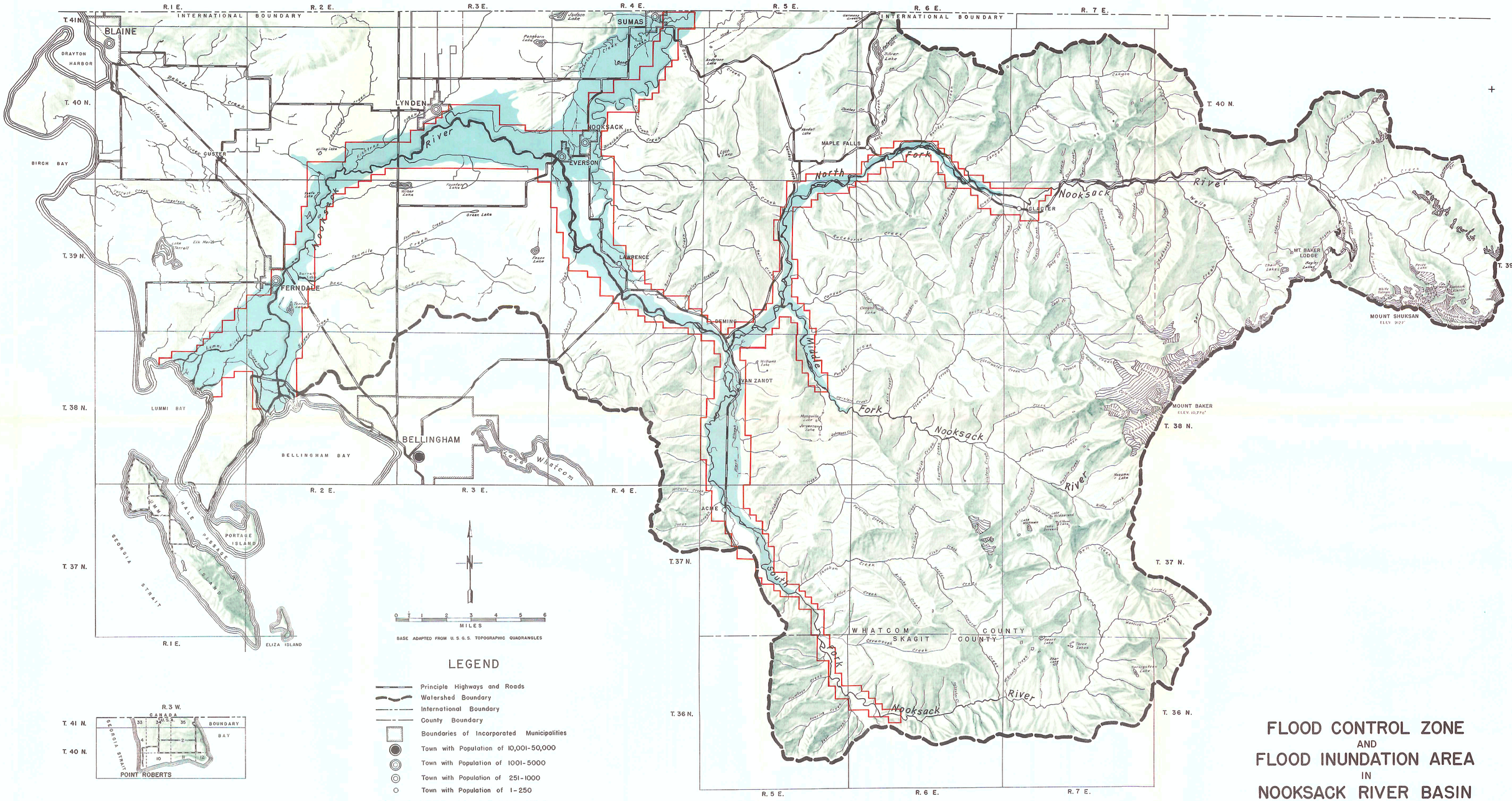
PLATE 5



RUNOFF MAP
OF
NOOKSACK RIVER BASIN
AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960



FLOOD CONTROL ZONE AND FLOOD INUNDATION AREA IN NOOKSACK RIVER BASIN

AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960

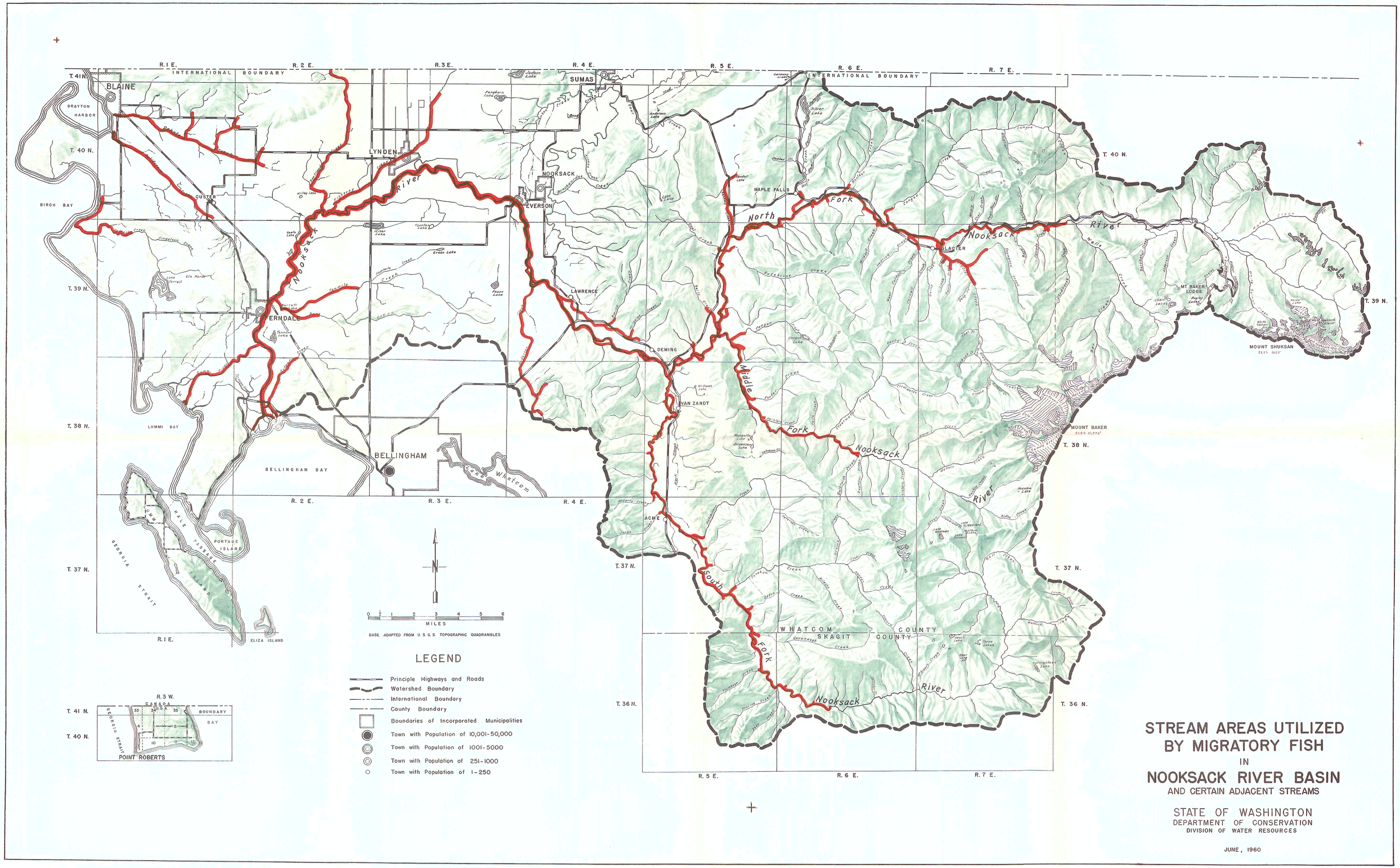
WATER DEVELOPMENT PROJECTS

NOOKSACK RIVER BASIN

AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960



STREAM AREAS UTILIZED BY MIGRATORY FISH IN NOOKSACK RIVER BASIN

AND CERTAIN ADJACENT STREAMS

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

JUNE, 1960