Adapted from Freeze and Cherry, 1978.

**FIGURE 3.2**
SYSTEMS REPRESENTATION OF THE HYDROLOGIC CYCLE
SPokane County / Level 1 Assessment / WA
FIGURE 4.4: Average Monthly Precipitation
Spokane County
Watershed Assessment
013-1392, tables for rpt.xls, 09/13/2001

Legend
- Spokane International Airport
- Coeur d'Alene 1 E
- Deer Park 2 E
- Newport
- Mount Spokane Summit
FIGURE 4.6:
Average Monthly Snowfall
Spokane County
Watershed Assessment
013-1392, tables for rpt.xls, 07/25/2001
FIGURE 4.7a: Accumulated Daily Precipitation and Snow Water Equivalent (SWE) - Quartz Peak, stn 45031
Spokane County
Watershed Assessment
013-1392, SWE vs Prcp.xls, 08/07/2001
FIGURE 4.7b: Accumulated Daily Precipitation and Snow Water Equivalent (SWE) - Bunchgrass MDW, stn 45004

Spokane County
Watershed Assessment
013-1392, SWE vs Prcp.xls, 08/07/2001
Note: SWE for Deer Park and Mt. Spokane calculated by assuming that 1 inch snow fall = .1 inch SWE. (Linsley, et al., 1992). Spokane International Airport based on collected data.
FIGURE 4.9:
Mean Monthly Temperature
Spokane County
Watershed Assessment
013-1392, tables for rpt.xls, 07/25/2001

<table>
<thead>
<tr>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coeur d'Alene 1 E</td>
</tr>
<tr>
<td>Deer Park 2 E</td>
</tr>
<tr>
<td>Mt Spokane Summit</td>
</tr>
<tr>
<td>Newport</td>
</tr>
<tr>
<td>Spokane</td>
</tr>
<tr>
<td>Spokane International Airport</td>
</tr>
</tbody>
</table>

Time (month)

Temperature (F)
Water Year

Rescaled Cumulative Departure From Monthly Means

Precipitation, Base Period 1937-1976

Legend

- Cool PDO
- Wet
- Warm PDO
- Dry

POR 1889 - 1999.
NOTE: Gage location varies

FIGURE 4.10a: Cumulative Departure Trends, Spokane International AP (stn 457938)
Spokane County
Watershed Inventory Assessment
013-1372, 07/23/01, id457938graphs.xls
FIGURE 4.10b: Cumulative Departure Trends, Colfax 1 NW
Spokane County Watershed Assessment
POR 1893 - 1990.
NOTE: Gage location varies
013-1372, 07/23/01, id457938graphs.xls
### Generalized Stratigraphy

#### Quaternary

<table>
<thead>
<tr>
<th>Era</th>
<th>Age</th>
<th>Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent</td>
<td>Present to 12,000 years</td>
<td><strong>ALLUVIUM</strong> (Qa) - Stratified clay, silt, sand and gravel. Reworked glacial flood deposits (Qfs/Qfg/Qfcg) and loess (Ql).</td>
</tr>
<tr>
<td></td>
<td>12,000 to 2 million years</td>
<td><strong>LACUSTRINE DEPOSITS</strong> (Qa) - Fine sand, silt, clay and peat in post-glacial lakes.</td>
</tr>
<tr>
<td></td>
<td>5 to 24 million years</td>
<td><strong>ALLUVIAL FAN DEPOSITS</strong> (Qa) - Gravel, sand and silt where steep drainages enter lower gradient and larger drainages.</td>
</tr>
<tr>
<td></td>
<td>500 to 16,000 million</td>
<td><strong>LOESS</strong> (Ql) - Unstratified silt and clay with little fine sand and volcanic ash.</td>
</tr>
<tr>
<td></td>
<td>years</td>
<td><strong>ALLUVIAL DEPOSITS</strong> (Qal) - Stratified clay, silt, sand and gravel. Reworked glacial flood deposits (Qfs/Qfg/Qfcg) and loess (Ql).</td>
</tr>
<tr>
<td></td>
<td>38 to 100 million years</td>
<td><strong>GLACIAL FLOOD DEPOSITS, PREDOMINANTLY SAND</strong> (Qfs) - Poorly to well sorted, bedded and massive, fine to coarse sand with trace cobbles and boulders.</td>
</tr>
<tr>
<td></td>
<td>5 to 24 million years</td>
<td><strong>GLACIAL FLOOD DEPOSITS, PREDOMINANTLY GRAVEL</strong> (Qfs) - Poorly to well sorted, matrix and clast supported, bedded and massive, sand, cobbles and boulders.</td>
</tr>
<tr>
<td></td>
<td>38 to 100 million years</td>
<td><strong>GLACIAL FLOOD-CHANNEL DEPOSITS, PREDOMINANTLY GRAVEL</strong> (Qfs) - Poorly to well sorted, matrix and clast supported, bedded and massive, sand, cobbles and boulders.</td>
</tr>
<tr>
<td></td>
<td>100 to 16,000 million</td>
<td><strong>WANAPUM BASALT, PRIEST RAPIDS MEMBER</strong> (Tw) - Dark gray to black, fine grained basalt.</td>
</tr>
<tr>
<td></td>
<td>500 to 16,000 million</td>
<td><strong>GRANDE RONDE BASALT</strong> (Tgr) - Dark gray to black, fine grained basalt.</td>
</tr>
<tr>
<td></td>
<td>30 to 100 million years</td>
<td><strong>METAMORPHIC BASEMENT</strong> (B) - Quartzite, argillite, schist and gneiss.</td>
</tr>
<tr>
<td></td>
<td>500 to 16,000 million</td>
<td><strong>IGNEOUS BASEMENT</strong> (B) - Coarse grained quartz monzonite to granodiorite.</td>
</tr>
</tbody>
</table>

#### Eocene to Late Cretaceous

<table>
<thead>
<tr>
<th>Era</th>
<th>Age</th>
<th>Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambrian</td>
<td>500 to 16,000 million</td>
<td><strong>METAMORPHIC BASEMENT</strong> (B) - Quartzite, argillite, schist and gneiss.</td>
</tr>
</tbody>
</table>

#### Mass Wasting Deposits

<table>
<thead>
<tr>
<th>Era</th>
<th>Age</th>
<th>Deposits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12,000 to 2 million years</td>
<td><strong>GLACIAL LAKE DEPOSITS</strong> (Qgl) - Massive and bedded, fine sand and silt. May be interbedded with sand and gravel flood deposits.</td>
</tr>
</tbody>
</table>

#### Source

SOURCE: Washington State Department of Natural Resources (2001)
LEGEND FOR GEOLOGIC CROSS-SECTIONS
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA

STRATIGRAPHY

QUATERNARY UNCONSOLIDATED UNITS
- Qal/Qaf: ALLUVIUM
- Qmw: MASS WASTING DEPOSITS
- Ql: LOESS
- Qfg: FLOOD GRAVELS
- Qfs: FLOOD SANDS
- Qfog: FLOOD CHANNEL GRAVELS
- Qgl: GLACIAL LAKE DEPOSITS
- Qs: UNDIFFERENTIAL QUATERNARY SEDIMENTS

TERTIARY UNITS
- Tw: WANAPUM BASALT
- Tl: LATAH SEDIMENTS
- Tgr: GRANDE RONDE BASALT

PALAEOZOIC TO PRECAMBRIAN UNITS
- B: CRYSSTALLINE BASEMENT

WELL INFORMATION

WELL 1
1/4 1/4 H
SECTION 6
RANGE 45
TOWNSHIP 25
(DNR WELL ID)

WELL 01
1/4 1/4 J
SECTION 06
RANGE 44
TOWNSHIP 27
(SPOKANE COUNTY WELL ID)

2GQID
(DEER PARK GW STUDY WELL ID BY SECTION)

STATIC GROUNDWATER LEVEL

FIGURE 4.13
Golder Associates
SPECIAL NOTE: Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DEER PARK GROUNDWATER MANAGEMENT CHARACTERIZATION STUDY (EMCON, 1992), SECTION C-C'.

SEE FIGURE 4.14 FOR LEGEND.
SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DEER PARK GROUNDWATER MANAGEMENT CHARACTERIZATION STUDY (EMCON, 1992), SECTION B-B'.

K:\CAD\Projects\2001\1131372\1700\96112.dwg 01/15/2004, 07:39  Layout: Layout1
SPECIAL NOTE: Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: AQUIFER DELINEATION OF A PORTION OF NORTH SPOKANE COUNTY (BOESE AND BUCHANAN, 1996), SECTION H.

SEE Figure 4.14 FOR LEGEND.
SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: AQUIFER DELINEATION OF A PORTION OF NORTH SPOKANE COUNTY (BOESE AND BUCHANAN, 1996), SECTION A-A'.

SEE FIGURE 4.14 FOR LEGEND.

DATA SOURCE: AQUIFER DELINEATION OF A PORTION OF NORTH SPOKANE COUNTY (BOESE AND BUCHANAN, 1996), SECTION A-A'.
SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE: Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: AQUIFER DELINEATION OF A PORTION OF NORTH SPOKANE COUNTY (BOESE AND BUCHANAN, 1996), SECTION C-C'.

FIGURE 4.14
CROSS-SECTION E-E'
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA

Golder Associates
SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DNR 2001 DRAFT SECTION Z-Z'
BASED ON CH2M HILL (2000) MICROGRAVITY AND DNR MEAD GEOLOGY.

FIGURE 4.14F
CROSS-SECTION F-F'
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA

Golder Associates
SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.


SEE FIGURE 4.14 FOR LEGEND.

FIGURE 4.14G
CROSS-SECTION G-G'
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA
SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DNR 2001 DRAFT SECTION R-R'
BASED ON CH2MILL (1998) WELL LOG DATA
AND TRINITY TROUGH SEISMIC.

K:\CAD\Projects\2001\131372\1700\98118.dwg 01/15/2004, 07:50  Layout: Layout1

Golder Associates
See Figure 4.14 for legend.

Special note: Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.


Golder Associates
SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

SEE FIGURE 4.14 FOR LEGEND.

SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.


FIGURE 4.14L
CROSS-SECTION L-L'
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA
SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DNR 2001 DRAFT SECTION H-H
BASED ON WELL LOG DATA CH2MHILL (1998).
SPECIAL NOTE:
Data concerning the various strata have been obtained at exploration locations only. The interpretation between these locations has been inferred from geological evidence and so may vary from that shown.

DATA SOURCE: DNR 2001 DRAFT SECTION F-F'
BASED ON WELL LOG DATA AND REGIONAL GEOLOGY.
SPOKANE VALLEY
(1/8 MILE WEST OF WASHINGTON-IDAHO STATE LINE)

CRYSTALLINE BASEMENT

Qfcg

Qg

Qfg

SPOKANE RIVER

Qa

CRystalline Basement

DATA SOURCE: DNR 2001 DRAFT SECTION B-B'
BASED ON DNR (1994) UNPUBLISHED SEISMIC
AND PURVES (1969) GRAVITY DATA.

SPECIAL NOTE:
Data concerning the various strata have been obtained
at exploration locations only. The interpretation between
these locations has been inferred from geological
evidence and so may vary from that shown.

SEE FIGURE 4.14 FOR LEGEND.

10x VERTICAL EXAGGERATION

FIGURE 4.14O
CROSS-SECTION O-O'
SPOKANE COUNTY/LEVEL 1 ASSESSMENT/WA

Golder Associates
FIGURE 5.4a: Total Annual Flow Volume vs Total Annual Precipitation - WRIA 55

Spokane County
Watershed Inventory Assessment

013-1372, 06/19/01, id169.xls
FIGURE 5.4b: Total Annual Flow Volume vs Total Annual Precipitation - WRIA 57

Spokane County
Watershed Inventory Assessment
013-1372, 06/19/01, id169.xls

Legend

- Spokane River At Spokane Wa (stn 12422500) vs. Coeur D'Alene 1E (stn 101956), WY 1960-1990

R² = 0.6532
FIGURE 5.5a:  
Little Spokane River At Elk, WA (USGS stn. 12427000)  
Spokane County  
Watershed  
013-1392, id143graphs.xls, 10/07/2001  
  
Legend  
- Max Recorded Daily Flow  
- Average Daily Flow  
- Min Recorded Daily Flow  
  - 1968 - Dry Year  
  - 1959 - Average Year  
  
POR 1949-1971. Surrogate year used for Average and Dry year data
FIGURE 5.5b:
Little Spokane River, Chattaroy Rd., Chattaroy, WA (SCC 8327Q)
Spokane County
Watershed Assessment
013-1392, id147 graphs.xls, 08/09/2001

Legend
- Max Recorded Daily Flow
- Average Daily Flow
- Min Recorded Daily Flow
- 1994 - Dry Year
- 1999 - Average Year
- 1997- Wet Year

POR 1976 - present
FIGURE 5.5c: Little Spokane River at Dartford, WA (USGS gage 12431000)
Spokane County
Watershed Assessment
013-1392, id142 graphs.xls, 07/23/2001
FIGURE 5.5d: Little Spokane River Near Dartford, Wash. (USGS gage 12431500)

Legend
- Max Recorded Daily Flow
- Average Daily Flow
- Min Recorded Daily Flow


Spokane County Watershed Assessment
013-1392, id146 graphs.xls, 07/23/2001
FIGURE 5.5e:
Spokane River near Post Falls, ID (USGS gage 12419000)
Spokane County
Watershed Assessment
013-1392, id172 graphs.xls, 10/15/2001
FIGURE 5.5f:
Spokane River abv Liberty Bridge nr Otis Orchard,
Wash  stn. 12419500
Spokane County
Watershed Assessment
013-1392, id164graphs.xls, 07/24/2001
FIGURE 5.5g:
Spokane River Blw Greene St at Spokane, WA
(USGS gage 12422000)
Spokane County
Watershed Assessment
013-1392, id170 graphs.xls, 07/24/2001

Legend
- Max Daily Recorded Flow
- Average Daily Flow
- Min Daily Recorded Flow
- 1994 - Dry Year
- 1997 - Wet Year

Recurrance Interval of 7-Day Average Minimum Flows in WRIA 55

August MISF - Minimum Instream Flows for August, Ch 173-5555 WAC
FIGURE 5.6b: Recurrence Interval of 7-Day Average Minimum Flows in WRIA 57
Spokane County
Watershed Inventory Assessment
August MISF - Minimum Instream Flows for August, 1999 Ltr WDFW
013-1372, 07/25/01, 7 day low flow.xls
FIGURE 5.7a:
Little Spokane River At Elk, WA (USGS stn. 12427000)

Spokane County
Watershed Assessment
013-1392, id143graphs.xls, 10/07/2001
FIGURE 5.7b:
Little Spokane River, Chattaroy Rd.,
Chattaroy, WA (SCC 001)
Spokane County
Watershed Assessment
013-1392, id147 graphs.xls, 07/23/2001

Legend
- Instream Flow Requirements
- 1994 - Dry Year
- 1999 - Average Year
- POR 1976 - present
- 1997 - Wet Year

Note: Baseflow estimates not available for this gage
FIGURE 5.7c: Little Spokane River at Dartford, WA (USGS gage 12431000)
Spokane County
Watershed Assessment

Legend
- **Average Baseflow**
- **Instream Flow Requirements**
- **1997 - Wet Year**
- **1999 - Average Year**
- **1994 - Dry Year**

Note: Baseflow not computed during spring thaw (March through June)
FIGURE 5.7d:
Little Spokane River Near Dartford, WA (USGS gage 12431500)
Spokane County
Watershed Assessment

Legend
- Average Baseflow
- Instream Flow Requirements
- 1999 - Average Year

Note: Baseflow not computed during spring thaw (March through June).
Instream Flows are for Confluence Control Point downstream of this gage.
FIGURE 5.7e:
Spokane River At Spokane WA (USGS gage 12422500)
Spokane County Watershed Assessment
013-1392, id169 graphs.xls, 07/24/2001

Legend

- Suggested Instream Flow (1999 Ltr, WDFW)
- 1999 - Average Year
- 1994 - Dry Year
- 1997 - Wet Year

Note: Estimated baseflow data not available for this gage