

# Watershed Features

## Part 1: Data Summary

### Description

The Municipality’s watershed coverage depicts Anchorage-vicinity watershed, subwatershed, and drainage area features. Data for the MOAWsheds coverage are stored in a geodatabase format and may be compiled for distribution in ArcInfo and ArcView formats.

**Corporate Dataset Name:**

MOAWsheds

**Feature Class Name:**

e04MWsheds

**Polygons:**

- Watershed
- Subwatershed
- Drainage
- Remnant watershed
- Composite watershed
- Other\_basn



### Creation Data Method

Data was created using a combination of the MOA 5meter DEM and the USGS 1:63,000 DEM to initially delineate the watersheds and subwatersheds using the hydrologic tools available in ArcInfo. Further refinements to watershed boundaries were made using the MOA stream, road, stormpipe, and contour line coverages as well as stereoscopic photographic analysis and field observation.

Data Availability	Extent of Data
Available as ‘MOAWsheds’ in shape file and ArcGIS file format. Features stored in WMS Geodatabase.	Municipality of Anchorage corporate area Suggested viewing scale 1:6,000 or smaller
Publication Information	Contact Information
<b>Revision:</b> V4.0	<b>Distribution:</b> Charlie Barnwell (BarnwellCE@muni.org) Mike Kiker (KikerMR@muni.org ) Phil Manke (MankePJ@muni.org)
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<b>Produced by:</b> Municipality of Anchorage OPD & PW Watershed Management Section	

# Watershed Features

## Part 2: Definitions and Mapping Methods

### Watershed Feature Types

Watershed features mapped by the Municipality of Anchorage include whole or parts of stream drainage basins and include watersheds, subwatersheds, remnant and composite watersheds, and drainages. Municipal watershed mapping may also include unclassified fractions of watersheds identified as ‘other basins’ (see Table 1). Subdrainages (storm water runoff basins) and their associated outfall features are mapped in other Municipal coverages.

**Table 1**

MOA WATERSHED FEATURES			
Feature Name	Type	Representation	Description
Watershed	Polygon	Watershed	A ‘hydrologically pure’ or ‘classic’ watershed
Subwatershed	Polygon	Watershed	A major fraction of a watershed drainage area
Drainage	Polygon	Watershed	A minor fraction of a watershed drainage area
Remnant	Polygon	Watershed or subdrainage	A very small, isolated (interfluvial or interior) watershed or subdrainage
Composite	Polygon	Watersheds	The combined area of a watershed and associated remnant watersheds
Other_Basn	Polygon	Unclassified stream drainage area	A large unclassified fraction of a watershed drainage area
Subdrainage	Polygon (not mapped)	Storm water runoff basin	Land area drained entirely by non-stream flows (infiltration, sheetflow, or drainageways)

### Watershed Feature Definitions

Definitions of Municipal watershed features are derived from, and are generally consistent with, national mapping concepts and definitions (see particularly USGS’ “Hydrologic Unit Maps” at <http://water.usgs.gov/GIS/huc.html>, and NRCS’ “Federal Standards for Delineation of Hydrologic Unit Boundaries” at [http://www.ftw.nrcs.usda.gov/huc\\_data.html](http://www.ftw.nrcs.usda.gov/huc_data.html), and “Mapping and Digitizing Watershed and Subwatershed Hydrologic Unit Boundaries” at <http://www.ftw.nrcs.usda.gov/HUC/ni170304.html>).

Municipal watersheds and subwatershed features are mapped as classic hydrologic features (they represent land areas having all surface drainage converging at a single stream cross section). Watershed and subwatershed features mapped within the Municipality may not meet the minimum size criteria (40,000 acres—about 62 square miles—for watersheds, and 3,000 acres—about 5 square miles—for subwatersheds) but do meet all other National Hydrologic Database (NHD) defining criteria.

### Watershed

A classic watershed is a land and water area that has all the surface drainage within its boundary converging at a single point, either at the outlet point of a stream feature or at some cross section along the stem of a stream feature. Municipal watersheds are typically comprised of “mountain to sea” classic watersheds. All Municipal features defined as watersheds converge at main stem stream outlets where they discharge to marine water. In this sense they match the criteria for nationally defined watersheds.

However, because Municipal watersheds drain a mountainous peninsular landmass and discharge to deeply embayed marine inlet features, their typical size is generally small relative to the national definition. In fact, of the 25 classic watersheds currently mapped by the Municipality, only nine meet the national minimum size requirement of 40,000 acres for a watershed, and six of the 25 are too small to meet minimum national criteria for a subwatershed. Nevertheless, recognition of some smaller classic stream drainages at Anchorage as watershed-scale features is useful from a local watershed management perspective.

## Subwatershed

A Municipal subwatershed is a subdrainage area of a Municipal watershed that has all the surface drainage within its boundary converging at a single point along the main stem watershed stream (preferably, but not necessarily, at a tributary outlet). Municipal subwatersheds generally meet all national defining criteria for these features with the exception of size. Like Municipal watershed features, some Anchorage subwatersheds are smaller than the minimum national size limit established for these features. (Of 52 subwatersheds mapped in the Municipality, 17 do not meet the national minimum size requirements of 3000 acres.)

Though most Anchorage subwatersheds are classic watershed features with outlets located at a stream outlet, some have outlet points other than at tributary confluences. Although this type of watershed subdivision is sanctioned nationally under certain circumstances, national mapping criteria do not encourage this delineation type. However, practical watershed management considerations at Anchorage often dictate a limited application of this approach. Specifically, stream features in the Anchorage vicinity are relatively linear. In addition, most Anchorage area watersheds have headwaters in undeveloped alpine valleys with lower reaches flowing across heavily urbanized coastal plains and hillslopes. Establishing subwatershed boundaries to distinguish the undeveloped upper portions of these watersheds from the developed lower portions is often a necessary management tool.

## Remnant Watershed

Remnant watersheds are relatively small natural drainage areas whose surface runoff does not flow to the outlet point of any larger hydrologic unit. Because of the Municipality's coastal position, 'remnant' drainage areas are common in the Anchorage area. In the Anchorage vicinity, remnant areas occupy coastal interfluvial lowlands and mountain spurs and are drained by small first order streams or by natural drainageways.

## Composite Watershed

The Municipality maps remnant watersheds as separate features but typically associates these smaller features with larger adjacent classic watershed features for cataloguing and management purposes. These conjoined drainage areas make up composite watersheds. Composite watersheds may include several separate stream networks and stream outlets, and therefore are not classic watershed features (i.e., hydrologically simple or 'pure' with single flow convergence points).

## Drainage

Within any watershed or subwatershed the Municipality may further delineate "drainage" and "subdrainage" areas for use in detailed watershed planning and assessment.

Drainages have the following characteristics:

- Comprise all, or major fractions of, individual *stream* watercourse networks.
- Allow focused assessment and management of the uses of and impacts to a single stream.

Subdrainages (mapped in separate Municipal coverages) have the following characteristics:

- Comprise whole drainageway features (*non-stream* watercourse networks).
- Allow focused assessment and management of storm water runoff factors.
- Classified as either an "outfall basin" type (surface flows conveyed by man made conveyances) or a "natural basin" type (surface flows conveyed by natural drainageways).

## Other\_Basn

Large stream drainage basins within the Municipality that have only been partially delineated or have not been classified as watersheds, subwatersheds, or remnant watersheds are identified as ‘other\_basn’ features. The Knik River basin is an example of an ‘other\_basn’ feature (the Knik River basin includes all drainages of the Knik and Matanuska Rivers, including substantial contributing area outside the Municipal corporate boundaries).

## Watershed Feature Mapping

Municipal watershed features are mapped to provide basic geographic information appropriate for viewing with select digital ortho-imagery and for use in making planning level decisions in watershed and natural resource management. Watershed mapping is also intended to provide a small scale, whole stream context for analysis and modeling of pollutant generation and transport. To support these uses, Municipal watershed features and boundaries are mapped with careful consideration to constructed storm water conveyances as well as to natural topographic drainageways.

Municipal watershed mapping is performed in four basic steps:

1. Small scale automated watershed delineation
2. Detailed modification of watershed boundaries to reflect constructed and natural drainageways
3. Subdivision of watersheds into subwatersheds and drainages
4. Compilation of watersheds and remnant watersheds into composite watersheds

Initial automated watershed mapping applies flow direction and watershed extraction tools to DEM raster data (U.S. AeroMap, Inc., 2001 5m elevation data, and USGS 1988 15 minute elevation data for current MOA map product) to generate watershed boundaries. These initial watershed boundaries are then manually adjusted to digital ortho-imagery (AeroMap US 1996 2-foot black and white imagery and U.S. Geological Survey 1996 digital orthophoto quads—DOQs—1 meter black and white imagery for current product) based on inspection of contour mapping and stereoscopic models of 1:12000-scale color aerial photography. Boundaries are further adjusted to reflect MOA mapped locations of piped and ditched storm drain systems.

Once outer watershed boundaries are established, delineated features are identified as ‘watersheds’ or ‘remnant watersheds’ based on national defining criteria (including size) but with consideration to features’ local importance as watershed management targets (typically related to degree of urbanization). Watershed features may be further subdivided into subwatersheds and drainage features, again applying national delineation criteria in context with local watershed management needs. Subdrainage features are mapped under separate mapping efforts.

Finally, watersheds are associated with adjacent remnant watersheds to form ‘composite watersheds.’ In Anchorage, most remnant watersheds are small basins draining interfluvial mountain spurs and lowlands along the marine shoreline. By definition, these remnant features have no direct surface hydrologic connection to adjacent larger watershed features. Therefore, in associating the small remnant basins with adjacent watersheds, some effort is made to recognize any common links that may exist outside of surface water hydrology (e.g., continuity or commonality in land use, ground water systems, terrain, vegetation, recreation or wildlife corridors and uses, etc.).

# Watershed Features

## Part 3: Data Dictionary

The following data dictionary contains basic attribute information about the MOAWsheds polygon featureclass. For further information about these attributes, please see Part 2: Definitions and Mapping Methods. Attributes are not listed in the order that they appear in the featureclass attribute tables.

### **e04MWsheds attributes:**

#### **ACRES**

Area of polygon in acres (Source: Data Dictionary)

#### **AREA**

Area of polygon (Source: ESRI)

#### **COMPOSITE**

The combined area of a watershed and associated remnant watersheds (Source: Data Dictionary)

#### **DRAINAGE**

Name of the associated MOA drainage feature. (Source: Data Dictionary)

#### **MOA\_WTRSHD**

Internal feature number. (Source: ESRI)

#### **OBJECTID**

Internal feature number. (Source: ESRI)

#### **OBJECTID\_1**

Internal feature number. (Source: ESRI)

#### **OTHER\_BASN**

A large unclassified fraction of a watershed drainage area (Source: Data Dictionary)

#### **PERIMETER**

Perimeter of polygon (Source: ESRI)

#### **REMNANT**

A very small, isolated (interfluvial or interior) watershed or subdrainage (Source: Data Dictionary)

#### **SHAPE**

Feature geometry. (Source: ESRI)

#### **SHAPE\_AREA**

Area of feature in internal units squared. (Source: ESRI)

#### **SHAPE\_LENGTH**

Length of feature in internal units. (Source: ESRI)

**SUBWTRSHED**

Name of the associated MOA watershed feature. (Source: Data Dictionary)

**WATERSHED**

Name of the associated MOA watershed feature. (Source: Data Dictionary)

# Watershed Features

## Part 4: FGDC Metadata

### Identification\_Information:

#### Citation:

Originator: MOA Watershed Management Section

Publication\_Date: 01/15/2005

Publication\_Date: REQUIRED: The date when the data set is published or otherwise made available for release.

Title: e04MWsheds

Geospatial\_Data\_Presentation\_Form: vector digital data

Online\_Linkage: \\Zim\Data\wms\031016\_sde\_selected\SDEDevelopment031024updates.mdb

#### Description:

Abstract: The Municipality's Watershed coverage depicts Anchorage-vicinity watershed, subwatershed, and drainage area features. Data are stored in a geodatabase format and are compiled for distribution in ArcInfo and ArcView formats. All features can be derived from a single ArcInfo coverage or from 4 separate ArcView Shape files. Data was created using a combination of the MOA 5meter DEM and the USGS 1:63,000 DEM to initially delineate the watersheds and subwatersheds using the hydrologic tools available in ArcInfo. Further refinements to watershed boundaries were made using the MOA stream, road, stormpipe, and contour line coverages as well as stereoscopic photographic analysis and field observation.

#### Purpose:

Municipal watershed features are mapped to provide basic geographic information appropriate for viewing with select digital ortho-imagery and for use in making planning level decisions in watershed and natural resource management. Watershed mapping is also intended to provide a small scale, whole stream context for analysis and modeling of pollutant generation and transport. To support these uses, Municipal watershed features and boundaries are mapped with careful consideration to constructed storm water conveyances as well as to natural topographic drainageways.

Municipal watershed mapping is performed in four basic steps, including small scale automated watershed delineation, detailed modification of watershed boundaries to reflect constructed and natural drainageways, subdivision of watersheds into subwatersheds and drainages, and compilation of watersheds and remnant watersheds into composite watersheds.

Supplemental\_Information: Watershed features mapped by the Municipality of Anchorage include whole or parts of stream drainage basins and include watersheds, subwatersheds, remnant and composite watersheds, and drainages. Municipal watershed mapping may also include unclassified fractions of watersheds identified as 'other basins'. Subdrainages (storm water runoff basins) and their associated outfall features are mapped in other Municipal coverages.

#### Time\_Period\_of\_Content:

##### Time\_Period\_Information:

Single\_Date/Time:

Calendar\_Date: 2003

Currentness\_Reference: ground condition

#### Status:

Progress: In work

Maintenance\_and\_Update\_Frequency: Continually

#### Spatial\_Domain:

##### Bounding\_Coordinates:

West\_Bounding\_Coordinate: -150.288260

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North\_Bounding\_Coordinate: 61.670689

South\_Bounding\_Coordinate: 60.538050

#### Keywords:

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Theme\_Keyword: watershed, drainage, subdrainage,

Place:  
Place\_Keyword: Anchorage, Alaska

Access\_Constraints:  
Refer to Municipality of Anchorage GIS Web page  
(<http://www.ci.anchorage.ak.us/gis/gisinternet/htmls/gishome.htm>)  
for official policy on use of MOA GIS data.

Use\_Constraints:  
Refer to Municipality of Anchorage GIS Web page  
(<http://www.ci.anchorage.ak.us/gis/gisinternet/htmls/gishome.htm>)  
for official policy on use of MOA GIS data.

Point\_of\_Contact:  
Contact\_Information:  
Contact\_Organization\_Primary:  
Contact\_Organization: MOA-DPW-Technical Services  
Contact\_Person: Phil Manke  
Contact\_Position: IT Supervisor  
Contact\_Address:  
Address\_Type: mailing address  
Address: Department of Public Works, P.O. Box 196650  
City: Anchorage  
State\_or\_Province: AK  
Postal\_Code: 99519-6650  
Country: USA  
Contact\_Voice\_Telephone: (907) 343-8220  
Contact\_Electronic\_Mail\_Address: MankePJ@muni.org  
Hours\_of\_Service: 8-5  
Contact\_Instructions: Please use phone as primary contact interface

Native\_Data\_Set\_Environment: Microsoft Windows 2000 Version 5.1 (Build 2600) Service Pack 1; ESRI ArcCatalog 8.3.0.800

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   Unrepresentable\_Domain: : Whole numbers that are automatically generated.

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   Attribute\_Definition\_Source: Data Dictionary

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   Distributor:  
     Contact\_Information:  
       Contact\_Organization\_Primary:  
         Contact\_Organization: MOA-DPW-Technical Services  
         Contact\_Person: Phil Manke  
         Contact\_Position: IT Supervisor  
       Contact\_Address:  
         Address\_Type: mailing address  
         Address: Department. of Public Works, P.O. Box 196650  
         City: Anchorage  
         State\_or\_Province: AK  
         Postal\_Code: 99519-6650  
         Country: USA  
       Contact\_Voice\_Telephone: (907)-343-8220  
       Contact\_Electronic\_Mail\_Address: MankePJ@muni.org  
       Hours\_of\_Service: 8-5  
       Contact\_Instructions: Please use phone as primary contact interface

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   Digital\_Form:  
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Metadata\_Date: 20031028

Metadata\_Contact:

Contact\_Information:

Contact\_Organization\_Primary:

Contact\_Organization: MOA-DPW-WMS

Contact\_Person: Scott Wheaton

Contact\_Position: Watershed Scientist

Contact\_Address:

Address\_Type: mailing address

Address: Department of Public Works, P.O. Box 196650

City: Anchorage

State\_or\_Province: AK

Postal\_Code: 99519-6650

Country: USA

Contact\_Voice\_Telephone: (907) 343-8117

Contact\_Electronic\_Mail\_Address: WheatonSR@muni.org

Hours\_of\_Service: 8-5

Contact\_Instructions: Please use phone as primary contact interface

Metadata\_Standard\_Name: FGDC Content Standards for Digital Geospatial Metadata

Metadata\_Standard\_Version: FGDC-STD-001-1998

Metadata\_Time\_Convention: local time

Metadata\_Access\_Constraints:

Refer to Municipality of Anchorage GIS Web page

(<http://www.ci.anchorage.ak.us/gis/gisinternet/htmls/gishome.htm>)

for official policy on use of MOA GIS data.

Metadata\_Use\_Constraints:

Refer to Municipality of Anchorage GIS Web page

(<http://www.ci.anchorage.ak.us/gis/gisinternet/htmls/gishome.htm>)

for official policy on use of MOA GIS data.

Metadata\_Extensions:

Online\_Linkage: <http://www.esri.com/metadata/esriprof80.html>

Profile\_Name: ESRI Metadata Profile