Access Raster Layer
Raster Objects

- **RasterDataset**: GRID, Tiff
- **Raster**: runtime virtual copy of a RasterDataset
- **RasterBand**: Bands in a RasterDataset
- **RasterLayer**: visual representation of a raster
- **PixelBlock**: A container of pixels
- **RasterDescriptor**: The “selectionset” of a raster query

**Operator Objects:**
- RasterExtractionOp
- RasterReclassOp
- RasterMathOp
- RasterLocalOp
- RasterNeighborhoodOp
- RasterZonalOp

Access Raster Layers

**Direct Access**
```vba
Dim pRLayer As IRasterLayer
pRLayer.CreateFromFilePath "H:\GEOG490\Data\plne"
```

**Via WorkspaceFactory**
```vba
Dim pWkspFactory As IWorkspaceFactory
Set pWkspFactory = New RasterWorkspaceFactory

Dim pWksp As IRasterWorkspace
Set pWksp = pWkspFactory.OpenFromFile("H:\GEOG490\Data", 0)

Dim pRDataset As IRasterDataset
Set pRDataset = pWksp.OpenRasterDataset("plne")

Dim pRLayer As IRasterLayer
pRLayer.CreateFromDataset pRDataset
```

**Via GxDialog**
```vba
Dim pFilter As I GXObjectFilter
Set pFilter = New GxFilterRasterDatasets

Dim pGxObject As IEnumGXObject
bObjectSelected = pGxDialog.DoModalOpen(ThisDocument.Parent.hWnd, pGxObject)

Dim pGxDataset As IGxDataset
Set pGxDataset = pGxObject.Next

Set pRLayer = New RasterLayer
pRLayer.CreateFromDataset pGxDataset.Dataset
```
### RasterQuery

**Get Raster Layer**

```vba
Dim pLayer As IRasterLayer
Dim pRaster As IRaster
Set pLayer = pMap.Layer(0)
Set pRaster = pLayer.Raster
```

**Setup QueryFilter**

```vba
Dim pQFilter As IQueryFilter
Set pQFilter = New QueryFilter
pQFilter.WhereClause = "Value = 2"
```

**Create RasterDescriptor**

```vba
Dim pRasDes As IRasterDescriptor
Set pRasDes = New RasterDescriptor
pRasDes.Create pRaster, pQFilter, "value"
```

**Use RasterDescriptor**

```vba
Dim pConOp As IConditionalOp
Dim pOutputRaster As IGeoDataset
' Run conditional operation.
Set pConOp = New RasterConditionalOp
Set pOutputRaster = pConOp.Con(pRasDes, pRasDes)
```

**Display OP result**

```vba
Dim pOutputLayer As IRasterLayer
Set pOutputLayer = New RasterLayer
pOutputLayer.CreateFromRaster pOutputRaster
pOutputLayer.Name = "QueryOutput"
pMap.AddLayer pOutputLayer
```

### MakePermanent

**Specify output file/wksp**

```vba
Dim pWSF As IWorkspaceFactory
Dim pWS As IRasterWorkspace
Set pWSF = New RasterWorkspaceFactory
Set pWS = pWSF.OpenFromFile(pGxDialog.FinalLocation.FullName, 0)
```

**Get raster from layer**

```vba
Dim pRasterLy As IRasterLayer
Dim pRaster As IRaster
Set pRasterLy = pMap.Layer(0)
Set pRaster = pRasterLy.Raster
```

**Get rasterdataset from the 1st band of the raster**

```vba
Dim pRasBandC As IRasterBandCollection
Dim pRasterDS As IRasterDataset
Set pRasBandC = pRaster
Set pRasterDS = pRasBandC.Item(0).RasterDataset
```

**Define temporary dataset**

```vba
Dim pTempDS As ITemporaryDataset
Set pTempDS = pRasterDS
```

**Make permanent**

```vba
' Format can be "GRID", "TIFF", or "IMAGINE Image"
' Note: format string is Case sensitive
pTempDS.MakePermanentAs pGxDialog.Name, pWS, "GRID"
```
Raster Operations

FocalStatistics Example

' Create the RasterNeighborhoodOp object
Dim pNbrOp As INeighborhoodOp
Set pNbrOp = New RasterNeighborhoodOp

' Create the neighborhood object
Dim pNbr As IRasterNeighborhood
Set pNbr = New RasterNeighborhood
pNbr.SetCircle 3, esriUnitsCells

' Call a function to open a raster dataset
Dim pInputDataset As IGeoDataset
Set pInputDataset = OpenRasterDataset("D:\SpatialData", "inputraster")

' Create output using the method
Dim pOutputRaster As IRaster
Set pOutputRaster = pNbrOp.FocalStatistics(pInputDataset, _
    esriGeoAnalysisStatsMajority, pNbr, False) 'set ignore nodata to false
FocalStatistics - esriGeoAnalysisStatisticsEnum

<table>
<thead>
<tr>
<th>Constant</th>
<th>Value</th>
<th>Description</th>
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<tr>
<td>esriGeoAnalysisStatsMajority</td>
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</tr>
<tr>
<td>esriGeoAnalysisStatsVariety</td>
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<td>Variety.</td>
</tr>
</tbody>
</table>

PixelBlock
Use PixelBlock

- Query Raster & RasterBandCollection
  Dim pRaster As IRaster
  Set pRaster = pRasLyr.Raster
  Dim pRasBandCol As IRasterBandCollection
  Set pRasBandCol = pRaster

- IRawPixel & IRasterProps
  Dim pRawpixel As IIRawPixel
  Set pRawpixel = pRasBandCol.Item(0)
  Dim pRasterProps As IRasterProps
  Set pRasterProps = pRawpixel

- Specify the dimension of PB using DblPnt
  Dim pSize As IPnt
  Set pSize = New DblPnt
  pSize.SetCoords pRasterProps.Width, pRasterProps.Height

- Get pixel values into PB
  pRawpixel.Read pPnt, pPixelBlock

- Retrieve pixel values from PB
  Dim PixelValue, position_x, position_y
  PixelValue = pPixelBlock.GetVal(0, position_x, position_y)

IIdentify Interface

- Provides access to members that identify features.

Dim pRasLyr As IRasterLayer
Dim pRaslyr = pMxDoc.SelectedLayer
Set pIdentify = pRasLyr

Dim pArray As IArray
Set pArray = pIdentify.Identify(pGeom)

Dim pRasID As IRasterIdentifyObj
If TypeOf pArray.Element(0) Is IRasterIdentifyObj Then
  Set pRasID = pArray.Element(0)
  MsgBox pRasID.MapTip
End If