

## **Scenario**

The Town of Nix (pop. ~18,000) is a rapidly developing rural-suburban community in the Bronco Watershed, which drains into Touchdown Lake, a 200-acre freshwater lake used for:

- Drinking water (emergency backup source)
- Recreation (boating, swimming, fishing)
- Residential (permanent & summer homes)
- Habitat for native fish and migratory birds

Nix is experiencing suburban sprawl, and with it, increased impervious surface cover, degraded stream corridors, and an uptick in flooding and runoff events. The town is divided into four major zones:

1. Residential Subdivisions: Characterized by large lawns, frequent use of synthetic fertilizers, aging septic systems, and limited stormwater controls. Many neighborhoods are located near unnamed tributaries of Bronco Creek.
2. Small and Mid-Sized Farms: A mix of row crops (corn and soybeans), hayfields, and livestock operations. Agricultural drainage ditches often connect directly to headwater streams. Riparian areas are present but inconsistently maintained.
3. Light Commercial Corridors: Auto shops, strip malls, and warehouses dominate these areas. Large parking lots and minimal stormwater infrastructure contribute to runoff carrying oil, grease, road salts, and other pollutants.
4. Natural and Recreational Areas: Including Payton Greenway and Manning Nature Preserve. These areas provide important ecological and recreational value and serve as monitoring and education sites, but they are increasingly stressed by upstream land uses.

## **More Information**

- Three years of stream monitoring show increasing nitrate concentrations, sedimentation, and biological impairment, including reduced populations of pollution-sensitive macroinvertebrates
- E. coli spikes have caused repeated summer beach closures at Touchdown Lake
- Algal blooms are occurring earlier and more frequently each year
- Over 55% of stormwater in the town enters streams without treatment
- 35% of septic systems are over 30 years old, with limited inspection or maintenance

- Streambank erosion is worsening downstream of residential and agricultural areas
- Only 22% of residents can correctly identify or explain non-point source pollution
- The town lacks a stormwater utility and has no dedicated watershed protection funding
- No ordinance currently requires stream buffers or riparian protection on private land
- A previous zoning proposal related to development restrictions was rejected due to public opposition
- The town has received a \$500,000 state grant for non-point source pollution mitigation that must be used within two years and requires public support

## **Task**

Your consulting team has been asked to prepare a proposal and present it at the upcoming Watershed Resilience Forum, where town officials, residents, and business owners will be present.

You must deliver a plan that:

### **1. Diagnoses the Problem:**

#### **Identify the Top Three Sources of Non-Point Source Pollution**

- Identify the three most significant sources of non-point source pollution in the Bronco Watershed
- Explain why these sources are the most significant compared to other possible sources

For each identified source, explain:

- How land use practices contribute
- How resident or landowner behavior contributes
- How natural features of the watershed (e.g., soils, slopes, stream location) influence pollution transport

#### **Stream and Riparian Impacts**

- Explain how streams and riparian corridors are impacted **overall** in the watershed
- Explain how **each of the three pollution sources** specifically affects:

- Stream health
- Riparian function
- Aquatic habitat and water quality

## **2. Propose Integrated Solutions:**

**Design a set of interconnected, community-level actions to reduce non-point source pollution across the watershed.**

Your plan must:

- Include at least four specific, feasible strategies that address multiple land-use zones (e.g., residential, agricultural, commercial)
- Emphasize stream protection and restoration and reduction of polluted runoff
- Address both:
  - Physical or technical approaches
  - Changes in human behavior and land management practices

## **3. Engage the Community:**

**Describe how your plan will engage the community to ensure long-term success.**

Community engagement must include:

- Outreach and education
- Building public understanding and support
- Encouraging individual and group action
- Ensuring equitable participation across income levels, neighborhoods, and landownership types

## **4. Plan for Implementation and Challenges:**

- Describe a 2-year implementation approach for carrying out your proposal using the available grant funding (high-level priorities only; detailed budgeting is not required)
- Identify at least two challenges or obstacles to implementation and explain how they could be addressed
- Propose one or more metrics that could be used to measure the success of your plan over time