**Resilience implementation framework – template**

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| **Step** | **Action** | **Clarifying questions** | **Answers** | | | |
| **1** | Define the focal system | What is the system?  (e.g. ecosystem, organisation, business) |  | | | |
| What is the time scale being considered?  (e.g. years, decades, centuries) |  | | | |
| What is the spatial scale being considered?  (e.g. local, catchment, regional, national) |  | | | |
| What are the main functions / services to be maintained?  (e.g. habitat provision, carbon sequestration, financial return) |  | | | |
| **2** | Identify threats to the system | What are the possible threats/disturbances? | Biotic (biological) | Abiotic (physical/chemical) | | Social / economic / political |
|  |  | |  |
| What is the likely frequency within the timescale of interest? |  | | | |
| Are there synergistic effects? |  | | | |
| **3** | Identify boundaries of acceptable change | Is it described by structural changes?  (e.g. mortality of components of ecosystem; loss of habitat?) |  | | | |
| Is it described by functional changes?  (e.g. change of growth rate leading to loss of carbon sequestration?) |  | | | |
| Are the boundaries precise or fuzzy? |  | | | |
| Are thresholds thought to be involved? |  | | | |
| **4** | Identify resilience component to target and related management actions | Potential resistance actions? | Example threat A | | Example threat B | |
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| Potential recovery actions? |  | |  | |
| Potential adaptation actions? |  | |  | |
| Potential transformation actions? |  | |  | |
| **5** | Monitor and learn | Can adaptive management be practised?  (e.g. monitoring put in place to learn as implement) | Current monitoring | | Desirable monitoring | |
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**Example threats (Step 2)**

This list serves to prompt thinking in Step 2. It is not an exhaustive list of considerations and should be used in reflection of your own specific circumstance.

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| **Biotic** | **Abiotic** | **Socio-Economic** |
| Mammals (e.g. grey squirrel and deer) leading to a loss of regeneration, loss of value, increased mortality. | Climate change (e.g. changing temperatures and rainfall) leading to changes to site/species suitability, or to phenology (e.g. flowering/seed setting). | Change to grant scheme supporting land use or business development – changing owner/management objectives. |
| Tree Disease (e.g. Ash dieback, *Phytophthora ramorum*) leading to increased mortality or reduced growth. | Pollution (excessive atmospheric nitrogen deposition) impacting tree health or soil characteristics. | Reduction in value of markets (e.g. domestic timber) affecting viability of operations. |
| Loss of specific species (e.g. pollinating insects) leading to a lack of seed supply; of tree species (e.g. ash) leading to changing composition. | Extreme weather events – (e.g. winter storms causing large scale windthrow of trees; extended droughts leading to reduced growth, increased mortality, increased risk of wildfire; high rainfall events causing erosion, damage to infrastructure, flooding; unseasonal frosts). | Visitor impacts (e.g. recreational disturbance to ground nesting birds; footpath erosion) affecting site qualities. |
| Loss of natural processes (e.g. woody debris) leading to a loss of habitat quality. | Soil degradation through erosion or compaction. | Increased competition for funding internally and from other organisations impacting upon investment. |
| Insect pests (e.g. pine weevil; oak processionary moth) leading to increased mortality or reduced growth. |  | Decline in visitor numbers impacting support for or direct investment in ‘system’. |
|  |  | Building and infrastructure development leading to a loss of trees/woods. |
|  |  | Arson and other vandalism (e.g. fly-tipping). |

**Example management actions (Step 4)**

Appropriate actions may relate to one or more of the components (e.g. resistance, recovery, adaptation and transformation). This list serves to prompt thinking on management actions but is not intended to be exhaustive and should be considered in relation to your own specific circumstance for Step 4. The toolkits recommended in the RIF document may provide additional support.

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| PLANNING ACTIONS   * Contingency planning * Diversification through forest design (age, species choice, silvicultural systems, new acquisitions) * Procurement policies (e.g. biosecure plant sourcing policy) * Infrastructure planning (e.g. road systems for access)   SITE-BASED OPERATIONS   * Choice of restocking/replanting methods * Vegetation management (e.g. removal of competing vegetation around planted trees) * Watering regime (e.g. for street trees) * Pruning, thinning, and other management operations * Biosecurity (e.g. cleaning machinery regularly) * Improved monitoring to increase chance of detecting pests/pathogens at an early stage | INVESTMENT   * New methods/equipment to improve inspection and refine monitoring (e.g. remote sensing) * Specialist equipment and training to manage specific tree disease (e.g. canopy sprayers) * Diversifying income stream (e.g. beyond timber sales) * Public engagement activity (e.g. to improve public support for changes to plans) * Citizen science partnership (e.g. Observatree to broaden surveillance) |