---

output:

xaringan::moon\_reader:

css: [default]

nature:

highlightStyle: github

highlightLines: true

countIncrementalSlides: false

---

<style>

/\* 全局背景 \*/

.remark-slide-content {

background-color: #f2f2f2;

padding-top: 0;

}

/\* 顶部横条 \*/

.top-header {

background-color: #374b43;

color: white;

font-size: 34px;

font-weight: bold;

padding: 10px 30px;

margin: 0 -30px 20px -30px;

}

/\* 页脚 \*/

.footer {

margin-top: 25px;

text-align: center;

font-size: 14px;

font-style: italic;

color: #666;

}

/\* 网格布局 \*/

.grid-container {

display: grid;

grid-template-columns: repeat(3, 1fr);

grid-gap: 15px;

margin: 0 15px;

}

/\* 卡片样式 \*/

.box {

border-radius: 8px;

padding: 15px;

background: white;

box-shadow: 0 2px 4px rgba(0,0,0,0.1);

}

.box-title {

font-size: 16px !important;

font-weight: bold !important;

margin-top: 0 !important;

margin-bottom: 8px !important;

border-bottom: 1px solid rgba(0,0,0,0.2) !important;

padding-bottom: 5px !important;

}

.box-subtitle {

font-size: 13px !important;

font-style: italic !important;

margin-bottom: 8px !important;

color: #444 !important;

}

.box ul {

margin: 0 !important;

padding-left: 20px !important;

}

.box li {

font-size: 13px !important;

margin-bottom: 5px !important;

line-height: 1.3 !important;

}

.box1 { background-color: rgba(255, 220, 220, 0.7); }

.box2 { background-color: rgba(255, 235, 205, 0.7); }

.box3 { background-color: rgba(255, 248, 205, 0.7); }

.box4 { background-color: rgba(220, 255, 220, 0.7); }

.box5 { background-color: rgba(220, 235, 255, 0.7); }

.box6 { background-color: rgba(245, 220, 245, 0.7); }

</style>

<div class="top-header">3 Mangrove Restoration Site Identification</div>

<div class="grid-container">

<div class="box box1">

<div class="box-title">1. Data Collection & Preprocessing</div>

<div class="box-subtitle">Remote Sensing & Indices:</div>

<ul>

<li>Landsat, Sentinel-2, ALOS PALSAR imagery</li>

<li>DEM, LULC, water quality, pollution data</li>

<li>NDVI, NDWI, MSAVI2, EVI computation</li>

<li>Variable importance via Random Forest</li>

</ul>

</div>

<div class="box box2">

<div class="box-title">2. Degraded Mangrove Identification</div>

<div class="box-subtitle">Multi-temporal & Pollution Analysis:</div>

<ul>

<li>NDVI/NDWI trend analysis</li>

<li>LUCC change detection</li>

<li>Heavy metal (Cd, Cr, Zn, Pb) in sediments</li>

</ul>

</div>

<div class="box box3">

<div class="box-title">3. Ecological Health Assessment</div>

<div class="box-subtitle">Soil, Water & Microbes:</div>

<ul>

<li>Measure SOC, δ13C, NO3⁻-N</li>

<li>Analyze N-fixing & denitrifying bacteria</li>

<li>Integrate tidal & pH indicators</li>

</ul>

</div>

<div class="box box4">

<div class="box-title">4. Restoration Priority Zoning</div>

<div class="box-subtitle">GIS & Model Ranking:</div>

<ul>

<li>DEM & hydrology-based classification</li>

<li>B1–B12 bands + NDVI time series</li>

<li>TOPSIS multi-criteria ranking</li>

<li>Microbial network resilience analysis</li>

</ul>

</div>

<div class="box box5">

<div class="box-title">5. Deep Learning Classification</div>

<div class="box-subtitle">APSMnet Model:</div>

<ul>

<li>ResConv for local feature extraction</li>

<li>Transformer for spatial dependency</li>

<li>CRF for boundary refinement</li>

<li>Map LII & AWLII restoration zones</li>

</ul>

</div>

<div class="box box6">

<div class="box-title">6. Monitoring & Evaluation</div>

<div class="box-subtitle">Remote Sensing & Accuracy:</div>

<ul>

<li>UAV, Landsat, Sentinel-2 surveys</li>

<li>Sensor-based pH, NH4⁺-N, NO3⁻-N monitoring</li>

<li>Confusion Matrix, OA, Kappa (>90%)</li>

</ul>

</div>

</div>

<div class="footer">Wetlands — The Kidney of the Earth</div>

<!-- 添加右下角图标 -->

<style>

.logo {

position: absolute;

bottom: 15px;

right: 20px;

width: 60px;

}

</style>

<img src="logo.png" class="logo">